Cluster Management Synergy Valuation: Synthesis and Illustration of a Discounted Cash Flow Synergy Valuation Model for Cluster Management Organisations

Written by:

Neil de Kock

(DKCNEI002)

Supervisors:

Dr. Kanshukan Rajaratnam

Dr. Ryan Kruger

Abstract

The practice of cluster management has become an integral component to the modern cluster business environment. This research develops a framework for the valuation of synergies generated by a cluster management organisation (CMO) to be used as either a method of (ex-post) management evaluation or (ex-ante) for capital budgeting purposes. The theoretical framework is synthesised from clustering and business alliance (predominantly Mergers and Acquisitions (M&A) and Joint Ventures (JV)), literature. The case of the South African Furniture Initiative (SAFI) was used to inform model development and to illustrate practical application of the theoretical synergy valuation model. The case study found that the synergy valuation model faces problems with practical application due to the wide variety of activities commonly associated with CMO goals and objectives. It concludes that even though a synergy framework would provide a useful tool for evaluation and capital budgeting, further research is required to develop a more accurate method of impact estimation.

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ALSI	– All Share Index (on JSE)
CI	– Cluster Initiative
CIPM	– Cluster Initiative Performance Model (see: Sölvell, Lindqvist & Ketels, 2003)
CMO	– Cluster Management Organisation
DCF	– Discounted Cash Flow
DEDAT	– Department of Economic Development and Trade
DTI	– Department of Trade and Industry (South Africa)
ECEI	– European Cluster Excellence Initiative
F&PMSETA	– Fibre Processing & Manufacturing Sector Education and Training Authority
FCFF	– Free Cash Flow to Firm (in DCF)
FQD	– Furniture Qualifications Development Project (SAFI programme)
GCIS'12	– Global Cluster Initiative Survey 2012
GCR14/15	– Global Competitiveness Report 2014 - 2016
GDP	– Gross Domestic Product
IDC	– Industrial Development Corporation (South Africa)
IFC	– Institute for Collaboration
IPAP	– Industrial Action Policy Plan
JSE	– Johannesburg Securities Exchange
JV	– Joint Ventures
JVE	– Joint Venture Entity
M&A	– Mergers and Acquisitions
NDP	– National Development Plan for 2030 (South Africa)
NPC	– Non-Profit Company
NPV	– Net Present Value
OECD	– Organisation for Economic Cooperation and Development
QCTO	– Quality Council for Traders and Occupations

RPL – Recognition of Prior Learning Project (SAFI programme)

SAFI – South African Furniture Initiative

SAQA – South African Qualifications Authority

SG&A – Sales, General & Administrative Expenses

TV – Terminal Value (in DCF)

UCT – University of Cape Town

UNIDO – United Nations Industrial Development Organisation

WACC – Weighted Average Cost of Capital (in DCF)

WCFI – Western Cape Furniture Initiative

WEF – World Economic Forum

WESGRO – Western Cape Destination Marketing Investment and Trade Promotion Agency

SAFBC – South African Furniture Bargaining Council

SAFI NEC – South African Furniture Initiative National Executive Committee

SAFT TSC – South African Furniture Initiative Technical Steering Committee

Chapter 1: Introduction

1.1 Overview of Proposed Research

In the past 20 years the concept of regional (or industrial/business) clustering, a form of economic agglomeration (Rocha, 2004), has gained much ground as an approach to value creation and as a vehicle for economic growth (Lindqvist, Ketels & Sölvell, 2013). A cluster can be described as a regional phenomenon in which a group of economic actors, who share a common business interest, generate positive location specific externalities (or synergies) due to the presence of robust microeconomic inter-linkages (Porter, 1990). Examples of cluster regions include: Silicon Valley (IT), Hollywood (entertainment) and Germany (cars). The benefit of strong clusters are numerous and include advancements in labour specialisation and skills training, economies of scale and scope, low transport costs for physical resources and goods, high-levels of knowledge spill-overs, increased innovation, and a sustainable competitive advantage (Porter, 2000; Rocha, 2004; Boja, 2011).

Even though the study of economic agglomeration can trace its roots as far back as Von Thunen (1826) and Marshall (1890), the term 'cluster' was first used to address regional industrial competitiveness by Porter (1990). In his conceptual model (entitled *Porter's Diamond*[1]) the author identifies the four microeconomic pillars of competitive advantage as: (1) high quality suppliers and supporting industries, (2) advancement of input factors in terms of quality and efficiency, (3) a strong air of local competition driving productivity and innovation, and (4) sophisticated and growing markets for goods produced. Porter (1990) attributes effective competition and resulting value creation to the dynamic interaction of these four elements, especially in light of the close regional proximity of economic actors in a specific cluster region.

Clusters are not static. Regional actors and the level of interactions between microeconomic forces changes dynamically with the passage of time. The scope for cluster evolution was initially believed to be primarily driven by natural forces – i.e. a region either has strong cluster potential, or it does not (Andersson et al., 2004). However, in recent years the notion of actively managing the cluster development process has gained much ground. Sölvell & Williams (2013, pp.19) describe "innovation gaps" as the natural deficiencies in the microeconomic inter-linkages between cluster actors. The process of cluster management seeks to minimise the impact of these innovation gaps by facilitating cooperation (i.e. "bridging the gap") between various cluster actors.

[1] See also: 2.2.2 Porter's Diamond (pp.17)

The European Cluster Excellence Initiative (ECEI, 2012) maintains that the role of cluster management has been identified as a significant contributing factor in the development of strong cluster regions. Sölvell, Lindqvist & Ketels (2003, pp.23) liken cluster management activity to the "oil that lubricates" the operation of the "microeconomic (i.e. *Diamond*) value engine". In fact, numerous authors regard cluster management as an integral component of a successful modern business environment (including: Porter & Emmons, 2003; Sölvell, Lindqvist & Ketels, 2003; Ketels & Memedovic, 2008; and Müller et al., 2012), especially in developed economies (Ketels, Lindqvist & Sölvell, 2006). However, the notion of cluster management conveys a broad and diverse range of potential activities. The practice includes public policy measures, regional development and innovation programs (Andersson et al., 2004), as well as a number of privately funded institutes for collaboration like trade councils, business associations and/or cluster initiatives (CI) (Porter & Emmons, 2003).

As is the case with any economic venture, evaluation of cluster management practices is required in order to determine impact, legitimize services, facilitate organisational learning, and to aid in future operational decision making. Numerous studies have focused on evaluating and benchmarking the performance of cluster management activity (see for example: Sölvell, Lindqvist & Ketels, 2003; Lämmer-Gamp, zu Kôcker & Christensen, 2011; Oxford Research, 2011; Lindqvist, Ketels & Sölvell, 2013; Sölvell & Williams, 2013). However, Sölvell & Williams (2013) remark that only 60% of the participants in the 2012 *Global Cluster Initiative Survey* (GCIS'12) were subject to formal in-house cluster management evaluations. This poor statistic is predominantly attributed to definitional dissimilarities applied in different regional settings, multiple stakeholder groups with conflicting interests and motives, operational dissimilarities between different management practices, and the unique nature of potential promotional goals and activities in each case. These factors generally result in evaluations being complex and expansive endeavors, resulting in low adoption in practice.

Many authors, including Teigland & Lindqvist (2007); UNIDO (2010); and Sölvell & Williams (2013), have expressed a need for the further development of clustering and cluster management evaluation methods. The objective of this thesis is to develop a financial valuation framework for a Cluster Management Organisation (CMO). A synergy valuation approach for cluster management evaluations has not yet been illustrated in the literature. The framework determines the value of synergy, which is attributable to the actions taken by the CMO, generated between CI participants. This valuation framework can be used empirically (ex-post) as a form of management evaluation, or (ex-ante) as a capital budgeting tool.

A CI is defined by Sölvell, Lindqvist & Ketels (2003, pp.15) as "any organised efforts to increase growth and competitiveness of clusters, involving cluster firms, government, and/or the research community". These institutions seek to be the nexus of activity surrounding cluster management (or cluster promotional) activity and often serve as a medium for dialogue between public and private sector actors (Andersson et al., 2004). The CI generally has a facilitator – i.e. an individual or entity charged with the day to day operations of cluster support and promotional activity. A CMO is the formalization of the facilitator role (Melax, 2013). The CMO is generally incorporated as a non-profit organisation and provides cluster support based on decisions of a board representative of the CI.

The synergy valuation framework developed in this dissertation is extended from traditional business alliance literature. This is made possible due to the similarity in operational form and value impact between cluster management activity and that of other strategic business alliances - e.g. joint ventures (JV) and mergers & acquisitions (M&A).

1.2 Aim and Research Questions

The aim of this Masters dissertation is to develop a financial valuation framework to determine the value of synergies attributable to the impact of a CMO. A case study of the South African Furniture Initiative (SAFI) is conducted to inform practical concerns with regards to the theoretical valuation process.

The research problem has been formulated into the following research question (and sub-questions):

How can the financial impact of cluster management activity on participating entities be valued?

- What is a cluster/clustering? What does cluster management (or promotion) entail? What are CI's and CMO's? How does the CMO impact CI participants and add economic value?

- What processes originating from clustering yield synergy? How is synergy isolated from other value adding factors present in collaborations? How is synergy valued in JV contracts and M&A transactions?

The primary research question involves two components. First, 'what' is being valued? Secondly, 'how' can financial impact be determined? Secondary research questions support answering the 'how' and the 'what' related to the primary research question.

With regards to 'what is valued' this dissertation specifically focuses on the CMO as official facilitator of cluster promotional activity within a CI. The CMO entity is assumed to be a non-profit company (NPC) tasked with conducting cluster support services and activities based on collaboration and mutual value creation. Consumption of CMO support services and activities has a financial effect on participants. If the sum of the net effect after participation is greater than zero, synergy was gained.

This brings us to the 'how' of valuation. This dissertation extends the synergy valuation process as commonly applied to JV and M&A transactions. It utilises the discounted cash flow (DCF) valuation approach to determine the value of participants before and after the impact of CMO activity. In order to do so, the synergy valuation process, as well as the legal structure, operational objectives, and intended results of cluster management activity has to be determined.

1.3 Contribution of this Research

This dissertation aims contribute to the existing body of knowledge through a synthesis of existing cluster and business alliance literature with the aim of developing, and illustrating the application of, a CMO synergy valuation framework. The aim is to integrate cluster and financial theory (specifically on M&A and JV) in order to provide a practical tool for evaluating the impact of CMOs on cluster participants. The framework developed in Chapter 3 extends synergy valuation as traditionally applied to business alliance transactions and adapts this model to the CMO. The application of this valuation framework is then applied ex-ante in the numerical example presented in Section 5.5. This numerical example assumes that the decision to commence CMO operations has already been made. The valuation framework developed in Chapter 3 is applied as a capital budgeting tool (ex-ante) to inform the cluster members' decision to participate, or not participate, in the proposed CMO services and activities.

1.4 Scope and Limitations

This dissertation does not attempt to determine the impact of the entire cluster phenomenon – i.e. a cluster as defined by Porter (1990, 2000). It determines the impact of the CMO in its capacity as facilitator on the participating members of the CI. The firm-specific value drivers included in financial modelling are only those for which a causal link to a specific CMO program (service or activity) can be established. Certain knowledge-based and socio-territorial elements, often included in

management practices of successful clusters, are however of a non-economic focus (e.g. network development). The impact of these elements may be impossible to accurately quantify and attribute to individual members in pure financial (i.e. DCF) terms.

Multiple valuation models (e.g. market multiples and real options valuation) have been illustrated as viable methods for synergy value calculation. The decision to use DCF was made based on its frequent application in traditional business alliance literature, its sound fundamental principles, and relative ease of use compared to other models. It should be noted that DCF valuation is notoriously susceptible to estimation error due to the requirement to forecast expected future conditions. Sensitivity analysis and simulation can be used to decrease estimation error. However, the inclusion and assessment of these validation techniques fall outside the scope of this study and are recommended for future research.

With regards to the case of the SAFI, conducting a full scale synergy valuation was not possible due to information sensitivity concerns. The furniture industry in South Africa has over 2000 manufacturers and unfortunately the SAFI CMO does not possess all the relevant financial impact information required. Industry research and information collation is outlined as one of the key goals of SAFI over the next three years.

Furthermore, the four (privately owned) furniture manufacturing company managers interviewed during the case study process were all reluctant to provide financial information regarding actual historical and expected future project budgets. This seems apt in the light of the competitive nature of the relationship between participants and considering the potential for public availability of this research document. Moreover, the cluster manager specifically asked for access to this research document, increasing the likelihood of information reaching other cluster participants.

Non-disclosure of (company and manager) names and sensitive financial information was agreed to in order to obtain the required information to present an illustrative case. As a result, numerical data used in the illustrative example is modelled on, but does not constitute, real-world information obtained during the interview process. The aim of the case study is to include practical, real world perspectives and concerns of industry players in the development of a valuation model. The numerical exercise was conducted as part of the framework development process. The numerical example is included to illustrate application of the model process in order to inform the process for any future repetitions.

1.5 Data Collection Procedures and Analysis Methods Used

SAFI was selected as subject matter for the case study component. Data collection involved the use of multiple sources including: financial statements, policy documents and manager interviews. The financial modelling process used industry/economic information and historic financial data to set a baseline for predictions of expected future conditions. Manager interviews with the cluster manager and individual (privately owned) firm managers, as well as official SAFI documents were used to identify specific promotional activities and their impacts on participating firms.

The data collection process involved an initial communication (via email) with the cluster manager in order to assess a willingness to participate in this study. The next step involved obtaining historical financial data from both the CMO (SAFI) and participating member firms. Subsequently, the impact of the CMO on its constituent members is identified through an analysis of CMO promotional activity (services hosted) and by means of interviews with participating CI firm managers. Participation is defined by financial impact based on the promotional activity. The financial effect of participation is informed by manager estimates.

Data collection was approved by the University of Cape Town (UCT) Commerce Faculty ethics in Research Committee. This research seeks to contribute to the existing body of knowledge by synthesising existing cluster and business alliance literature and developing a CMO synergy valuation framework. The case study component was included to provide additional evidence on CMO operations. Participation in case study data collection was entirely voluntary and participants were given the option to withdraw, or request removal from the sample, at any time. Given the sensitivity of information concerns, the interview process remained independent and no individual company or manager names will be mentioned in this document. Furthermore, the numerical example is based on actual historical financial statement data obtained from interview participants. However, care was taken to ensure that exemplary financial statements were normalised to such an extent so it would be impossible to trace these back to a single entity.

1.6 Structure of the Research

Chapter 2 contains a literature study in which the fundamental principles related to the cluster phenomenon, cluster management activity, business synergy, and DCF valuation topics are analysed. The synthesis of cluster and synergy theory into a valuation framework is conducted in Chapter 3. The case study methodology is discussed in Chapter 4. Chapter 5 presents the case of SAFI and

illustrates practical application of the valuation framework. Discussions, concluding remarks and potential future avenues of research are discussed in Chapter 6.

Chapter 2: Literature Review

2.1 Introduction

2.1.1 Rationale for Literature Review

Kittel (2007, pp2.) defines strategic alliances as multidimensional inter-company relationships that generate significant incremental strategic value in the long term. The author describes the multidimensionality of strategic alliances which reference to the complex and wide ranging nature of cooperative activities. Furthermore, the value of strategic alliances goes beyond revenue enhancement or cost-reduction, but includes potential sources such as increased market share, diversification of product portfolios, knowledge transfer, and organisational learning (Kittel, 2007).

This dissertation theorizes that the activities in cluster management, more specifically that of the cluster management origination (CMO), bear a significant resemblance in terms of economic form and impact to other forms of strategic alliance transactions such as M&A and JV. Through facilitation of network development and knowledge sharing, it is argued that the process of cluster management, as described by Sölvell, Lindqvist & Ketels, (2003); Andersson et al. (2004);); Buhl & zu Köcker (2010); and Lämmer-Gamp, zu Köcker & Christensen (2011), actively seeks to promote the development of strategic alliances as defined by Kittel (2007).

This dissertation pursues the extension of existing CI evaluation literature by synthesizing a framework, and illustrating a model process, for determining the financial value of synergy generated within a cluster CI as a result of the actions of its CMO. This literature review is conducted to explore existing strands of clustering and synergy literature to inform the development of a CMO synergy valuation framework. Given the wide scope and definitional obscurity regarding clusters and clustering this literature review serves in setting a baseline interpretation of cluster related concepts used in the remainder of this thesis.

2.1.2 Topics Covered and Excluded in Literature Review

Topics that are covered in this literature review include the geographic cluster phenomenon (i.e. *Porterian* clusters as a form of economic agglomeration) and the cluster value creation mechanism. This includes a brief explanation of cluster history and development from its origins in land rent analysis into of the modern geographical/industrial cluster concept. This includes the identification

of a generally accepted cluster definition (including discussions with regards to definitional obscurity and why this vagueness exists). In order to gain an understanding of value creation in clusters, the key elements that form part of the cluster definition are analysed to determine the potential of, and rationale behind, cluster value creation.

Furthermore, the activities commonly associated with cluster management (or cluster promotion) are analysed. This includes a determination of a functional definition of cluster management and its link to the greater cluster value creation mechanic. The generally accepted goals and objectives of cluster management and life-cycle implications for value potential are also analysed. Furthermore, the philosophy and application of existing cluster management evaluation models is also discussed.

Finally, the concept of business synergy and the valuation thereof in traditional business alliances is assessed. This includes an analysis of the definition and rationale for synergy, as well as the current procedure involved in its valuation. DCF valuation was selected as the valuation methodology and the application of this framework to the synergy case is analysed. Due to time and world count limitations valuation models other than DCF, such as market multiples and real options valuation, are not addressed in great detail. Given the sound fundamental base of DCF theory and its relative ease of use, this valuation method was selected in favour of others.

Topics that have been excluded, or covered in lesser detail in this literature review, include considerations specific to public policy implications of clusters. This research focuses on the CMO as the management mechanism. The CMO is representative of the CI which, in theory, includes all stakeholders. Policy implications are included in the overall industry and economic analysis of the extent to which they have an impact on the performance of the CI through the cluster business environment.

Part A: Clusters and Cluster Management

2.2 The Geographic (or Industrial) Cluster Phenomenon

The agglomeration phenomenon dates back to the ancient Greek and Egyptian civilizations (Andersson et al., 2004; Rocha, 2004). It expresses the notion that the relationships and inter-linkages between economic actors in a spatially proximate region have the potential to generate beneficial externalities such as reduced costs and increased innovation (Krugman, 1991; Porter,

1990, 1998, 2000). Porter (1998, pp.81) specifically states that, “a cluster allows each member to benefit *as if* it had greater scale or *as if* it had joined with others without sacrificing flexibility”.

The modern academic study of economic agglomeration is believed to have originated in response to four principal observations (Krugman, 1991; Malmberg, Sölvell & Zander, 1996): (1) The majority of global production is located in a few concentrated areas. (2) Businesses in similar value chains tend to locate in relatively close spatial proximity to each other. (3) The businesses that are involved in agglomerative activity survive longer than those that operate in isolation. (4) Finally, agglomerated firms display a greater tendency for innovation and related positive effects on competitive advantage.

2.2.1 Origins and Evolution of Clusters

Some of the first written work on the subject of agglomeration, as cited by Aziz & Norhashim (2008) and Andersson et al. (2004), involved the study on land-rent analysis by Von Thunen (1826). In the publication entitled *The Isolated State*, Von Thunen focuses on land rental and demonstrates how farms agglomerate around a city centre.

The next leap forward was Marshall (1890) who was among the first to analyse and document the link between economic efficiency and spatial proximity (Porter, 1990; Martin & Sunley, 2003; Andersson et al., 2004; Rocha, 2004; Boja, 2011). According to Rocha (2004), Marshall (1890) identified what he came to call *Industrial Districts* and used this concept to explain the positive effects of agglomeration on individual firms. As cited by Boja (2011), Marshall (1890) observed three results that reinforce this agglomerative behaviour. (1) A reduction in costs related to time and transportation. (2) The presence of a larger specialized labour pool and (3) the ease of information transfer in a localized setting. However, Marshall's concept of *Industrial Districts* is a purely economic model and makes no mention of the social (knowledge based) interactions between members (Rocha, 2004; Boja, 2011).

Rocha (2004) notes that the Italian School of thought, which was pioneered by Becattini (1989, 1990), built on Marshall’s ideas by adding weight to the historical, territorial and socio-cultural elements present in the clustering phenomenon. As cited from Rocha (2004), Becattini (1990, p. 38) defines his vision of a cluster as “[a] socio-territorial entity which is characterized by the active presence of both a community of people and a population of firms in one naturally and historically bounded area”. According to Rocha (2004) this shift in focus, from an industry to geographic and socio-economic focus, highlights the perceived impact of agglomerations (not just on local firm

efficiency as Marshall had previously done) on regional economic and socio-cultural factors of development.

The inclusion of non-economic factors was a huge leap forward in the development of what we have come to know as clusters today and most current authors acknowledge the huge influence that these socio-territorial and cultural influences have on cluster dynamics (Diez, 2001; Sölvell, Lindqvist & Ketels, 2003; Rocha, 2004; Boja, 2011).

The next step in the evolution of the agglomeration concept, and by far the most significant, was Porter (1990). Until the early 1990's, governments and economic planners focused primarily on standard monetary and fiscal (macroeconomic) policies in search of stability, growth and development (Andersson et al., 2004). These practices include, amongst others; low inflation targeting and maintaining a favourable exchange rate and trade balance (Sölvell, Lindqvist & Ketels, 2003). Focusing instead on microeconomic principles Porter (1990) built on Marshall's concept of *Industrial Districts* and challenged the conventional wisdom with regards to regional growth and competitiveness. Porter (1990) claimed that a nation's major exporting businesses are not operating in isolation, but are more often groups of competing firms within a regional industry. The author called these groups 'clusters' and developed a theoretical framework (*Porter's Diamond*) in which he analysed the micro-economic factors that influence value and growth.

2.2.2 Porter's Diamond

Porter (1990) observed that the prevailing perceptions about competition were skewed. Far from the static, cost efficient and scale driven view persistent in the world at the time; he theorized that competition is driven by innovation and the interaction of microeconomic factors in the regional business environment. Porter (1990) first presented *Porter's Diamond* as a framework for the analysis of locational competitive advantage due to the interaction of microeconomic forces impacting regional companies.

Furthermore, according to Rocha (2004), Porter (2000) built on his initial concepts and included the idea that close spatial proximity drives the process of innovation and competitive growth. Resultantly, Porter (2000) presents a more comprehensive view of microeconomic interaction which includes the geographical and network based elements of agglomeration.

Porter's Diamond (Figure 1) is regarded as the force (or engine) that drives cluster growth through innovation and maintenance of a regional competitive advantage (Sölvell, Lindqvist & Ketels, 2003;

Boja, 2011). In Porter's (2000) view, a cluster is considered *The Diamond* at work; that is to say, a highly dynamic, competitive and innovative micro-economic business environment.

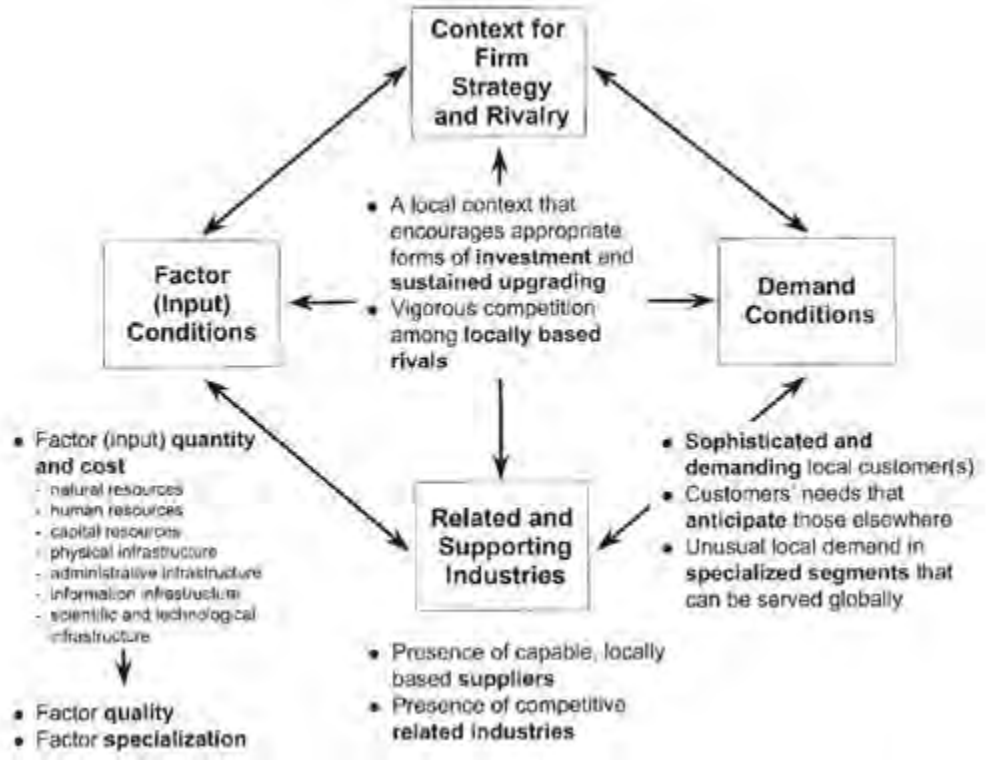

Figure 1: Porters Diamond - Sources of Locational Competitive Advantage

[Source: Porter, 2000, pp.20]

- **Related and Supporting Industries:** High quality related and supporting industries are crucial to the effective performance of the economic system (Porter, 1990). The presence of high quality suppliers that can deliver inputs timeously and consistently, as well as personal relationships with actors in related industries, is a key enabling factor for competitiveness (Melax, 2013). Personal relationships, due to the knowledge and skills spill-over effects, are considered especially important for firms in close regional proximity (Teigland & Lindqvist, 2007).

- **Factor (Input) Conditions:** Input conditions include the factors of production employed by multiple actors (e.g. business, government, finance, legal, academia, etc.) in the cluster region and, according to Porter (2000), should be ever increasing in terms of quality and efficiency. Specialized inputs are considered crucial to strong cluster dynamics (Teigland & Lindqvist, 2007).

Input conditions comprise all potential factors of production including tangible and intangible natural resources, information, skilled labour, specialized services, infrastructure, etc. (Melax, 2013).

- **Context for Firm Strategy and Rivalry:** The scope, intensity and complexity of local rivalry are considered key drivers of productivity (Porter, 2000). The author notes that weaker economies are characterized by a static competitive environment, predominantly focused on pricing and imitation. Alternatively, he notes that strong economies are characterized by dynamic competition on multiple fronts (e.g. pricing, quality, customer satisfaction). This dynamic competition is driven by high levels on innovation (as opposed to imitation), high levels of strategic investment and heavier reliance on intangibles (Porter, 2000). Furthermore, Teigland & Lindqvist (2007, pp.770) highlight an "emotional dimension" to interpersonal interactions in local rivalry. Emotional factors, fuelled by close proximity, contribute to the levels of innovation as economic actors seek to outperform local rivals (a proverbial 'keeping-up-with-the-Joneses' effect). The effect of peer pressure and pride is also mentioned by Porter (1998).

- **Demand Conditions:** The process of moving from a static to a dynamic competitive business environment is reliant on demand conditions (Porter, 2000). Better (more sophisticated) demand conditions are believed to translate into higher international competitiveness and a stronger cluster (Teigland & Lindqvist, 2007; Melax, 2013). Furthermore, it is quality (or sophistication) of demand, and not volume, that drives increases in technology and skills used in the regional economy (Porter, 2000).

Porter (1998) empirically found significant correlation to substantiate that strong cluster dynamics (as represented by *The Diamond*) accounts for productivity and innovation. However, critics of Porter's Diamond, including Raines (2002); Martin & Sunley (2003); and Aziz & Norhashim (2008), pointed out numerous flaws in *The Diamond* framework. Concerns voiced involve not only the vagueness of the cluster definition, but include cluster theorization, empirics and the claims made as to cluster benefits (Raines, 2002; Martin & Sunley, 2003).

Martin & Sunley (2003, pp.11) go as far as to state that Porter was "deliberately vague" in defining and explaining the impact and elements that make up clusters, pointing out that Porter mostly ignored related work in the field of economic geography. Furthermore, Aziz & Norhashim (2008) note that the diamond framework lacks recognition of the cluster life-cycle and it assumes a single-actor view which limits its potential as a policy planning tool.

2.2.3 Impact of Porter's Cluster Revolution

Porter's (1990) theory sparked a renewed interest in the age old agglomeration phenomenon and his work on the microeconomics of competitiveness was hugely influential in the structuring of the modern agglomeration field (Brown, 2000; Martin & Sunley, 2003; Sölvell, Lindqvist & Ketels, 2003; Rocha 2004; Aziz & Norhashim, 2008; Boja, 2011;). Furthermore, *Porter's Diamond* was specifically designed as a functional tool that showed some promise in the construction of a framework for policy intervention (Andersson et al., 2004).

However, as a result of the wide ranging impact and numerous unanswered questions, research intensified as academics from various backgrounds attempted to explain and isolate the innumerable elements and implications of clusters (Martin & Sunley, 2003; Rocha, 2004). This dramatic increase in the volume of research is evidenced by the vast amount of cluster literature published in the subsequent decades. In addition to an abundance of journal articles, the remarkable increase in cluster literature includes, as cited by Rocha (2004, pp368), numerous books (such as: "Pyke and Sengenberger, 1992; Saxenian, 1994; Van Dijk and Rabellotti, 1997; Steiner, 1998; Crouch et al., 2001) and various national and international publications (such as: Nadvi, 1995; OECD, 1996a; OECD, 1999; Ceglie and Dini, 1999; World Bank, 2000; UNIDO, 2001; Porter et al., 2001; Schwab et al., 2001; OECD, 2001a; OECD, 2001b; Observatory of European SMEs, 2002").

Due to the rapid advance of cluster research, various schools of thought emerged including, as cited by Rocha (2004), the *New Economic Geography* (Krugman, 1991); the *Innovative Milieu* (Camagni, 1991; Aydalot, 1996; Maillat, 1996); the *Nordic School of Innovation and Learning* (Lundvall & Johnson, 1994; Malmberg & Maskell, 1997; Lundvall & Maskell, 2000); the C*ultural-Institutional* approach (DiMaggio and Powell, 1983; Powell, 1990; Saxenian, 1994; Ingram and Roberts, 2000). However, these various schools of thought, grounded in different economic and social disciplines, often differ in opinion as to the drivers, elements and effects that are involved in the cluster sphere (Rocha, 2004).

In addition to identifying numerous functional theories on clusters, this time-period of explosive research dropped the cluster concept into a conceptual and definitional nightmare (Brown, 2000; Gordon & McCann, 2000; Ketels, 2003; Martin & Sunley, 2003; Sölvell, Lindqvist & Ketels, 2003; Andersson et al., 2004; Formhold-Eisebith & Eisebith, 2005; Aziz & Norhashim, 2008; Sölvell 2008; Boja, 2011). Furthermore, Formhold-Eisebith & Eisebith (2005) notes that the process of constant re-defining causes any attempts at practical application of the cluster concept to trail behind an ever changing conceptual definition.

2.2.4 Defining a Cluster

Porter initially defined clusters as "concentrations of interconnected companies and Institutions in the particular field" (Porter, 1998, pp.78) and later refines this definition to “a cluster is a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities" (Porter, 2000, pp.16).

Ketels (2003, pp.3) builds on Porter's (1998) definition and states that clusters are “groups of companies and institutions co-located in a specific geographic region and linked by interdependencies in providing a related group of products and/or services”. Sölvell (2008), on the other hand, defines clusters as one of four types of agglomeration, adding that clusters include a certain level of dynamism, political involvement and a life-cycle. Yet another cluster definition is that “clusters are geographic concentrations of interconnected companies, with linkages to related organisations such as trade associations, government agencies, and research and educational institutions” (Wares & Hadley, 2008, pp.1).

Numerous authors have pointed out the similarities between various definitions (Brown, 2000; Ketels, 2003; Andersson et al., 2004; Rocha, 2004; Aziz & Norhashim, 2008; Boja, 2011). Some authors have developed cluster definitions based on common elements contained in the cluster literature (for example: Andersson et al., 2004 and Aziz & Norhashim, 2008). Aziz & Norhashim (2008) provide a comprehensive definition of clusters synthesized from various strands of literature. In this view a cluster has the following four defining characteristics (Aziz & Norhashim, 2008, pp.352-353):

- *"a set of actors (firms from at least one industrial sector, agencies, and institutions) that have commonalities and complementarities;*
- *a significant geographical concentration of the actors giving rise to close proximity between actors leading to linkages and interactions through formal and informal setups between the actors, agglomeration economies, and high social capital;*

That

- *characteristically, besides the various economic activities, undergoes a significant level of knowledge/technology-intensive activities that promote transfers as well as spillovers; and*
- *collectively makes a significant impact on the larger economy (regional or national)"*

2.2.5 Key Elements of Accepted Definitions

The Geographical Dimension

The geographical dimension of clusters pertains to the spatial agglomeration of business activity, the physical proximity between member companies, and the distance that resources and information has to travel between its members (Porter, 1990, 1998; Andersson et al., 2004; Sölvell, 2008). Economic agglomeration is a school of study that deals with the geographical dispersion of economic activity. Sölvell (2008), citing a framework presented by Malmberg, Sölvell & Zander (1996), defines clusters as one of four types of agglomeration along with urbanization (cities), industrial districts and creative regions (Figure 2). In this view clusters (and their related benefits) are distinct from other forms of agglomeration and are mainly fuelled by innovative activities amongst firms that share commonalities and complementarities.

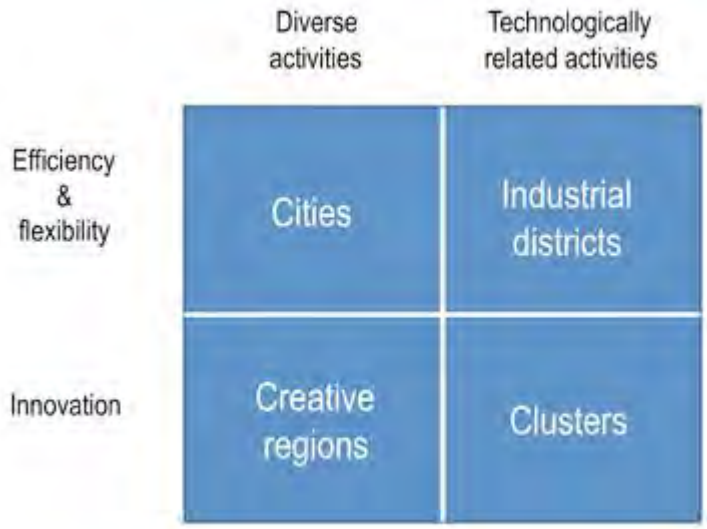

Figure 2: Clusters – One of Four Agglomerations

[Source: Sölvell, 2008, pp.11]

Marshall (1890) observed a tendency of firms to co-locate in a specific region due to the presence of a natural resource and was one of the first authors that documented the spatial agglomeration of economic activity (Rocha, 2004; Boja, 2011). Porter's (1990) clusters built on Marshall's fundamentals of efficiency and flexibility, but unlike Marshall, Porter's cluster concept is fundamentally based on innovation and competitive advantage.

Porter (1990) specifically mentions that the geographic bounds of a cluster relate only to the distance required for informational, transactional and other efficiencies to occur. This may be due to the fact that his cluster concept was targeted at developing a functional approach (Martin & Sunley, 2003). Even though this has led to some criticism regarding the aforementioned vagueness of definition, most authors do agree with Porter's assessment of the geographic bounds of a cluster. For example, Gordon & McCann (2000) state that there must be a physical limit to the size of a cluster, but that this is determined by the costs involved with overcoming that distance. Similarly, Enright (1996) mentions that the spatial bounds of a cluster need not even be limited to a single nation but can span multiple countries, provided economic benefits are attainable.

The Value Chain (or Industry) component

Clustering is fundamentally an industrial process (Andersson et al., 2004). Along with the geographical element, the identifying industry (or primary cluster value chain) is at the heart of the cluster phenomenon (Porter, 1990, 2000; Enright, 1996; Brown, 2000; Sölvell, Lindqvist & Ketels, 2003; Andersson et al., 2004; Aziz & Norhashim, 2008). According to Ketels (2003) clusters can be easily identified by the main type of product or service they produce – for example: automotive, IT, tourism, pharmaceutical, etc. However, cluster identification by industry alone is slightly problematic as the process of clustering amalgamates numerous components of multiple value chains and includes multiple actors (Martin & Sunley, 2003).

Porter's Diamond highlights the importance of related and supporting industries as one of the key elements of the microeconomic business environment (Porter, 1990, 1998, 2000). As such, clusters include numerous supporting activities that are associated with the primary cluster industry. Secondary services include: public bodies and agencies, legal and financial institutions, transport, research and education institutions, as well as numerous other business services such as accounting, auditing, cleaning, etc. (Porter, 1990, 1998, 2000; Ketels, 2003; Boja, 2011).

The Actors

Even though clusters are generally identified by primary industry (or value chain) activity (Ketels, 2003), clusters include numerous other instrumental role players (Porter, 1990, 1998; Sölvell, Lindqvist & Ketels, 2003; Andersson et al., 2004; Sölvell, 2008). Porter (1990) recognises industry players (primary value chain firms and those in related and supporting industries) as cluster actors. Primary value chain actors include up- and down-stream firms of varying sizes (Sölvell, 2008) and are

at the heart of clusters (Wares & Hadley, 2008). In addition to industry players Porter (1990) identifies government bodies, specialised suppliers, service providers and other institutions (such as: universities, trade associations and standards agencies) as key cluster actors. This multiple actor sentiment is maintained by most other cluster commentators including, amongst others, Ketels, (2003); Sölvell, Lindqvist & Ketels (2003); Andersson et al. (2004); and Organisation for Economic Cooperation and Development (OECD, 2010).

Clusters form part of the broader literature stream on public-private partnerships (Andersson et al., 2004; Teigland & Lindqvist, 2007). Sölvell (2008, pp.17) refers to the "visible hand" of policy intervention in the cluster sphere, indicating all attempts to guide development from a public intervention perspective. The important role that the public sector plays in terms of cluster promotion, cluster support and the facilitation of favourable micro- and macro-economic business conditions is noted by numerous authors including: Porter (1990, 1998, 2000); Ketels (2003); Andersson et al. (2004); OECD (2010); and Shehu (2015). The cluster policy impact and the role of government as a cluster actor is widely researched and well-documented both theoretically and empirically (Sölvell, Lindqvist & Ketels, 2003; Andersson et al., 2004; Aziz & Norhashim, 2008; Sölvell 2008; OCED, 2010; Sellar et al., 2011).

Academia and the research community are also included as key cluster actors by numerous authors (Ketels, 2003; Sölvell & Williams, 2003; Aziz & Norhashim, 2008). The role of these institutions is twofold: both research based and as education/training institutions (Sölvell & Williams, 2013). Both knowledge creation and skills development are considered key factors of cluster success (Sölvell, Lindqvist & Ketels, 2003). High levels of research and education along with spill-over effects and knowledge sharing resulting from close proximity to numerous other actors, creates a highly innovative cluster environment (Krugman, 1991; Sölvell, Lindqvist & Ketels, 2003; Braun, McRae-Williams & Lowe, 2005).

Financing institutions are also frequently mentioned as key cluster actors (Aziz & Norhashim, 2008; Sölvell, 2008; Sölvell & Williams, 2013). In cases where specialized capital providers have an in-depth understanding of a regional industry, these institutions are in a better position to assess the risks and potential involved in financing arrangements (Sölvell, 2008).

Another class of cluster actor, as defined by Porter & Emmons (2003), is the institute for collaboration (IFC). These are organisations specifically set up to facilitate cooperation between economic actors and include industry and professional associations, technology transfer centres, think tanks, etc. In the cluster sphere, CI's and CMO's are IFC's which seek to promote and facilitate

collaboration through increasing the dynamic inter-linkages which serve to drive cluster development and growth (Ketels, 2003; Sölvell, Lindqvist & Ketels, 2003; Teigland & Lindqvist, 2007; Lindqvist, Ketels & Sölvell; 2013; Melax, 2013).

Finally, clusters may indeed include other actors, such as the media or labour representatives (Sölvell, 2008), but it is commonly accepted that the classes outlined above form the core of the cluster phenomenon.

Institutional Thickness - The Critical Mass

As a result of the close spatial proximity between actors present in clusters, cluster participants have higher levels of interactions and inter-linkages than firms that are not part of a cluster (Wares & Hadley, 2008). This increased level of interaction and high volume of inter-linkages amongst cluster actors is what drives the economic and innovative benefits of clusters (Amin and Thrift, 1994; Porter, 1998, 2000; Sölvell, Lindqvist & Ketels, 2003; Aziz & Norhashim, 2008; Shakya, 2009; Sölvell & Williams, 2013).

However, in order for a cluster to reach this synergistic state a critical mass of actors and inter-linkages are required. Amin and Thrift (1994) propose the concept of institutional thickness to describe the presence of institutions and the level of interaction amongst them. The authors note that there is a minimum level of institutional thickness required before synergistic benefits will accrue. Similarly, Andersson et al., (2004) describes the critical mass as a minimum threshold in the density of economic actors within the cluster region. This density refers not only to material and capital assets available in the cluster, but also includes social capital (skills, trust, etc.) that can be utilised in order to drive a competitive advantage. It is unclear exactly what levels of asset density is required in order to reach this critical mass and is assumed specific to each individual cluster region (Andersson et al., 2004).

Once the state of critical mass is reached the cluster starts to generate beneficial externalities in the regional economy (Sölvell, Lindqvist & Ketels, 2003; Andersson et al., 2004; Shakya, 2009). This beneficial phenomenon increases the attractiveness of the region (Wares & Hadley, 2008) and new business formation is generally higher (Ketels, 2003). This process reinforces growth and development in the cluster as more actors lead to more linkages making the cluster more attractive (Wares & Hadley, 2008).

The Business Environment

Another key element of the cluster phenomenon is the specific macro- and micro-economic conditions prevailing in the cluster (Andersson et al., 2004). The main premise of *Porter's Diamond* (Porter, 1990) is the analysis of the microeconomic forces that impact the regional (or cluster) business environment and the firms that operate within it. An example of a cluster business environment condition is the existence of a culture of cooperation which enables firms to utilize each other's key competencies (Andersson et al., 2004).

Ketels & Memedovic (2008) describe the cluster business environment as the unique set of operating conditions that cluster constituents face. The authors describe this cluster business sphere as both parallel too, and distinct from, the general economic environment. Clusters operate within the context of regional and national economic systems and form part of the general (national) business environment. However, on a local level the cluster is distinct form the rest of the economic system due to the effects of combined interactions between a critical mass of cluster actors which creates favourable economic conditions (Ketels & Memedovic, 2008).

In addition to the specific microeconomic environment (as represented by Porter's Diamond) Sölvell, Lindqvist & Ketels (2003) identify other general business environment factors that influence the cluster sphere. These include: the national legacy and culture of the region, the presence of general institutions (such as trade councils and CI's), the local legal environment, and the prevailing macroeconomic environment (e.g. exchange rate and inflation).

Innovation in Clusters

The link between clusters and innovation is based in the idea that knowledge and information transferred through direct communication as opposed to formal mechanisms and high levels of personal interaction involved in well performing clusters creates a knowledge spill-over effect (Rocha, 2004). Andersson et al. (2004, pp38) describes clusters as the "nexus for activity" for innovation. In their view, innovation includes any form of improvement to the business process or product offering that yields economic benefit.

Porter (2000) specifically states that innovation in the cluster context refers to a continual drive for improvement through the exploration of new opportunities and a focus on developing strengths and mutual specialisation within the cluster. Sena (2004) contributes the high levels of innovation in clusters to a decreasing cost relationship between cooperation and physical distance and relates innovation to improvements in efficiency and better product offerings. Ketels (2009) mentions that

the cluster setting drives innovation through a higher volume of ideas and a lower cost of turning ideas into new goods.

However, multiple authors also note that innovation is hard to quantify and measure accurately (Andersson et al., 2004; Rocha, 2004). Given the difficulties in defining and identifying innovation in practice, a number of proxies are often used in order to quantify innovation including: R&D expenditure, number of scientific publications, new patents issued, and the presence of high growth firms (Andersson et al., 2004). However, even though R&D has been proven to be central to successful economic performance, the processes are mutually exclusive and high R&D expenditure does not automatically translate into achieving innovation (Mahr & Kretschmer, 2009).

Ultimately innovation in the cluster context applies to technical, commercial or organisational change (Andersson et al., 2004), that leads to efficiency (Sena, 2004) and new products or processes being adopted (Ketels, 2009).

2.2.6 Benefits of Clusters

Even though there may be some disparity regarding how exactly cluster benefits materialise (Martin & Sunley, 2003), most advocates of clustering unanimously agree on the potential for improving competitive strength and the possible benefits available by encouraging cluster behaviour (Porter, 1990, 1998; Krugman, 1991; Ketels, 2003; Andersson et al., 2004).

The economic benefits of clusters, as originally witnessed by Marshall (1890), involve geographical and operational correlations between clustered firms that have the capacity to generate substantial positive location-specific externalities (Porter, 1990, 2000; Krugman, 1991). These externalities are generated through the combined competitive and collaborative forces present within clusters (Formhold-Eisebith & Eisebith, 2005). Beneficial economic externalities include at least the following factors (Porter, 1990, 1998, 2000; Krugman, 1991; Ketels 2003; Rocha, 2004; Formhold-Eisebith & Eisebith, 2005):

- Economies of scale and scope resulting from increased networking and cooperation between firms.
- Advancements in labour specialization and skills training attributable to increased regional economic activity and knowledge spill-overs.
- Cost benefits due to the use of shared infrastructure.

- The ease of goods and information transfers due to the close proximity between suppliers and customers in the value chain.
- Improved competitiveness both regionally and for individual firms, not just through cost reductions, but via the advancement of innovation and the commercialization of new ideas.

In terms of 'non-economic' benefits (i.e. those not directly related to cost efficiencies), clusters play a central role in fostering innovation and developing a sustainable competitive advantage (Porter, 1990, 1998; 2000; Andersson et al., 2004). Innovation is regarded as the driving force behind creating and maintaining a competitive advantage and Porter (1990, pp.19) specifically states that "competition is dynamic and rests on innovation and the search for strategic differences". Andersson et al. (2004) also notes that, under the correct circumstances, innovation drives the actualisation of cluster benefits.

Sölvell, Lindqvist & Ketels (2003, pp. 19) present the following arguments promoting the use of clustering as vehicle for regional development. First, these authors maintain that any form of commercial innovation has a level of uncertainty and risk attached to its development process. This development process is well suited to a clustered network of firms, due to the ability for failures to be absorbed on a regional scale which makes their initiation more likely. Secondly, the close proximity of cluster participants promotes both networking and skills transfers which are associated with innovation and competitive advantage.

It should be noted, however, that the process of clustering is not without risks. One negative side effect of cooperation is a potential for decreased inter-member competition, leading to a decrease in locally fuelled innovation (Andersson et al., 2004). Additionally an over emphasises on specialisation may decrease flexibility, rendering the cluster vulnerable to external shocks like technological or demand change (Andersson et al., 2004). Furthermore, Martin & Sunley (2003) refer to the lock-in effect which describes a state where economic agents are so locally focussed that they forgo potential links to the outside (international) world.

2.2.7 Cluster –Life-cycle

Clusters develop and evolve over time (Ketels, 2003) and it may take many years for the clustering process to build efficient momentum to become economically significant (Sölvell, Lindqvist & Ketels, 2003). This evolutionary path, commonly referred to as the cluster life-cycle, has been addressed by numerous authors including: Brown (2000); Sölvell, Lindqvist & Ketels (2003); Andersson et al.

(2004); Sölvell (2008); and Ketels (2009). The cluster life-cycle provides a useful analytical tool (Ketels, 2009) as it accounts for a necessary distinction between newer and more established clusters and the varying impacts that these have on cluster actors.

Studies suggest that cluster development is a complex process which is partially driven by the potential for future strength and the natural capacity to evolve over time (Feldman & Francis, 2004). The evolutionary process leads clusters to become more self-sufficient and less dependent on government and other key individuals (Ketels, Lindqvist & Sölvell, 2006). Member firms in mature, well-established clusters report more promising results (Sölvell, Lindqvist & Ketels, 2003) and a greater value impact due to the overall cluster process (Rocha, 2004). Furthermore, the cluster's stage of development is closely linked to the quality of the general business environment and the co-operative (or networking) potential at play (Ketels, 2003).

Andersson et al. (2004) describes the cluster life cycle in five distinct stages (Figure 3).

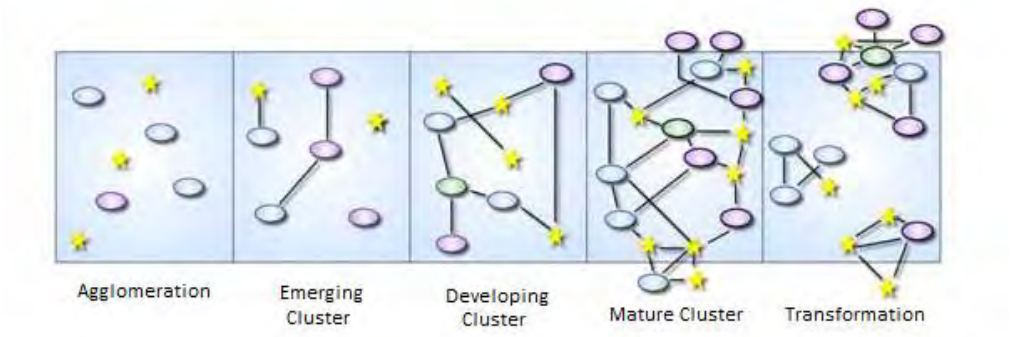

Figure 3: Cluster Life-cycle

(Source: Andersson et al., 2004, pp.29)

Agglomeration describes a situation where a region has a few economic actors. The emerging cluster describes the activities of the initial few participants who focus on a core activity and in so doing start realizing common opportunities through networking (Andersson et al., 2004). This period has also been described as the birth phase (Ketels, 2009) and is characterized as an infant industry with few actors' and low levels of inter-linkages between actors. However, in line with observations made by Porter (1998), Sölvell (2008) notes the requirement of a key resource or individual which is to become the enabling factor for future cluster development.

As more actors settle in a cluster region, more linkages and network opportunities develop (Andersson et al., 2004; Ketels, 2009) and during this development phase formal and/or informal

institutes for collaboration (Porter & Emmons, 2003) start to develop. This is generally the stage where policy interventions and CI's enter the fray (Andersson et al., 2004). This situation is marked by numerous market entrants from both new companies and spin-offs, improved networking and the development of social capital is a crucial value driver (Ketels, 2009).

The mature cluster describes the situation where a cluster region reaches the critical mass needed for fuelling cluster benefits (Andersson et al., 2004). In addition to the presence of strong networks within the cluster, mature clusters have developed relations to parties outside the cluster - e.g. international linkages (Ketels, 2009) and other clusters (Andersson et al., 2004).

Finally, as time passes, markets and technologies change and clusters have to adapt. Clusters cannot grow indefinitely (Ketels, 2009) and transformation refers to the inevitable process of clusters either going into decline or emerging as new industries or clusters through constant innovation and flexibility in adapting to changing conditions (Andersson et al., 2004). This decline in activity has been described as the museum phase by Sölvell (2008), which refers to the fact that eventually all industries run out of steam and quite often only a museum of the once proud cluster remains.

This evolutionary process of cluster development was initially thought to be reliant on external factors (Andersson et al., 2004). However, with the initial publication of *Porter's Diamond* (Porter 1990) as a framework that showed promise as a mechanism to evaluate policy interventions, the concept of cluster management was born. Section 2.3 takes a closer look at the topic of cluster management.

2.3 Cluster Management

Sölvell, Lindqvist & Ketels, (2003) define a dynamic (i.e. a successful, active, strong and value adding) cluster as one that demonstrations a number of characteristic features. (1) Dynamic clusters generally exhibit a network of interlinked relations to supplementary and supporting industries. (2) High levels of regional competitiveness and efficiency (due to low barriers to entry multiple competitors), ensures efficiency by promoting local innovation and new product development. (3) Successful clusters also tend to show a strong culture of cooperation. This highly intertwined relationship between actors promotes knowledge-sharing and improves innovation. (4) Finally, dynamic clusters generally have access to sophisticated, demanding and expanding markets, as well as access to ever advancing factors of production, labour and technology. Furthermore, these authors note that the existence of cluster benefits will incentivise new actors to join the regional

business environment which, in turn, will create additional inter-linkages and further scope for continued cluster growth in a mutually reinforcing process (Sölvell, Lindqvist & Ketels, 2003).

Initially, economic agglomerations were perceived to be subject to natural causes such as resource availability and level of social capital in the regional setting (Andersson et al., 2004). However, with the focus on the practical application of *Porter's Diamond* model, the notion of active management in clusters arose. Subsequently, numerous authors have advocated the potential for active management in cluster regions, either though publically funded support policies and programmes, or privately funded initiatives. Examples include amongst others: Porter (1990, 1998, 2000); Rosenfeld (1997); Ketels (2003); Andersson et al. (2004); Formhold-Eisebith & Eisebith (2005); Ketels, Lindqvist & Sölvel (2006); Ketels & Memedovic (2008); Shakya (2009); OCED (2010); Sellar et al. (2011); Melax (2013); Marešováa, Jašíkováb & Burešc (2014); Shehu (2015).

Cluster management activity is primarily focussed on stimulating the regional business environment (Sölvell, Lindqvist & Ketels, 2003; Andersson et al., 2004). The aim is to improve the level of networking, competitive behaviour and innovation in the cluster by providing value adding services and acting as a facilitator for collaboration (Sölvell, Lindqvist & Ketels, 2003; Buhl & zu Köcker, 2010; Lämmer-Gamp, zu Kôcker & Christensen, 2011;). However, clusters comprise multiple stakeholder groups (Porter, 1998; Ketels, 2003) which often results in cluster promotion being a multi-pronged activity consisting of public and private attempts at improving cluster operation (Ketels, 2003; Sölvell, Lindqvist & Ketels, 2003; Andersson et al., 2004). Furthermore, Wolfe & Gertler (2004) remarks that consensus on the formation process and the value of cluster management via CI's and/or policy measures cannot always be reached.

The ambiguous nature of cluster management is fuelled by the difficulties involved with defining the cluster phenomenon (Martin & Sunley, 2003; Formhold-Eisebith & Eisebith, 2005). It logically follows that any promotional strategies of an ill-defined concept would also be marred by definitional and operational obscurities. Additionally, due to the fact that no two clusters are exactly alike (physically and operationally), most cluster management strategies are sufficiently dissimilar in scope and operational requirements to makes direct comparisons difficult (Ketels, 2003; Sölvell, Lindqvist & Ketels, 2003; Teigland & Lindqvist, 2007).

Furthermore, according to Ketels (2003), cluster practitioners do not always wait for theory development to be finalised and the author mentions that certain concepts are simply easier to test once practically applied. Resultantly, Ketels (2003) notes that these initial attempts at supporting cluster development often commenced before theoretical principals could be sufficiently tested.

This presented a number of problems in terms of the definition, operation and perceived benefit of active management and promoting cluster development (Martin & Sunley, 2003; Formhold-Eisebith & Eisebith, 2005).

2.3.1 Public Sphere Cluster Management

Ketels & Memedovich (2008) describe government policy involvement in clusters as any and all efforts made by government bodies in an attempt to improve the of the competitiveness of localised industry including for example: financing, tax, innovation, or labour policy. A similar view is maintained by Sölvell (2008), who further distinguishes cluster policy into three classes. First, the set of microeconomic policies adopted by government that impact the business environment in general. This includes the legislative framework, national level policies (e.g. industrial development or innovation policy), political and investment atmosphere and other macro-economic factors (e.g. exchange rates, unemployment, inflation, etc.).

Secondly, cluster programs (or cluster specific policies) are publicly funded attempts aimed at creating industry specific clusters in certain regions (Sölvell, 2008). In the absence of an official definition, Melax (2013, pp.13) cites the European Cluster Policy Group's definition of cluster programmes as "organised efforts taken by government to increase the growth and competitiveness of clusters in its constituency". Cluster programs often have dedicated staff and an operational budget (Sölvell & Williams, 2013) and, as explained by Melax (2013), these publically-funded cluster programs are support facilities used by governments to directly intervene in cluster operation. Implementing agencies, the third class identified by Sölvell (2008), are the individual public institutions responsible for the management and implementation of cluster programs.

The literature on cluster policy is extensive and covers numerous topics from the development of practical methods for implementation (Shakya; 2009; Shehu, 2015), to the analysis of theoretical principals (Martin & Sunley, 2003; Andersson et al., 2004; Ketels & Memedovic, 2008), and the evaluation of their impact (Diez, 2001; Aziz & Norhashim, 2008). In general, the role of public intervention in cluster development is described as one that should uphold the necessary conditions in order to promote mutually beneficial engagements between actors (Ketels, 2003; Andersson et al., 2004; Ketels & Memedovic, 2008; OCED; 2010). As mentioned by Andersson et al. (2004), the perceived benefits of clusters are not necessarily enough to warrant direct policy involvement. Admittedly, Andersson et al. (2004) also mention that because industry operates within the sphere

of government influence, economic policy has an impact on the clustering process regardless of policy maker's intent, and should well be considered.

2.3.2 Institutes for Collaboration and Cluster Initiatives

One of the cornerstones of the modern clustering process is the flow of information through knowledge and skills transfer (Porter, 1990, 1998; Andersson et al., 2004; Rocha, 2004). Attaining a critical mass of members and inter-linkages in order to generate cluster externalities is crucial to cluster survival and expansion (Andersson et al., 2004; Sölvell, 2008). As such, establishing an effective communications and information network via the CI mechanism is now considered critical for successful cluster operation (Sölvell, Lindqvist & Ketels, 2003; Scheer & von Zallinger, 2007; Melax, 2013).

Institutes for collaboration (IFCs) are organisations that play a supporting role in the business sphere and can have a significant effect on cluster competitiveness (Porter & Emmons, 2003). Examples include trade councils, professional associations and non-profit think-tanks. CI's, a specific type of IFC, are defined by Sölvell, Lindqvist & Ketels (2003, pp.15) as "organised efforts to increase growth and competitiveness of clusters within a region, involving cluster firms, government and/or the research community". Similarly, Teigland and Lindqvist (2007) refer to CI's as a form of private-public partnership, consisting of the collaborative action between government, industry and academia, with the purpose of enhancing regional growth and competitiveness.

Moreover, as stated by Teigland and Lindqvist (2007, pp.768), it is important to understand that "a cluster initiative is not a cluster in the Porterian sense; rather it is an organisation [institution] set up to serve the cluster". Sölvell & Williams (2013) describe CIs as institutions that build the *cluster commons*. This commons is described as the "white space" (Sölvell & Williams, 2013, pp.7) between various actors in the cluster business environment consisting of common pool resources including: trust, shared identify and amount and quality of inter-linkages between actors.

CIs are believed to promote innovation, competitiveness and regional growth (Sölvell, Lindqvist & Ketels, 2003; Soviar, 2009). Given similarities with the common economic agenda (i.e. a focus on long-term regional competitiveness, the promotion of learning and innovation, and the development of cooperative networks within industry), CIs have become an integral part of modern economic policy planning (Ketels, 2003; Sölvell, Lindqvist & Ketels, 2003; Andersson et al., 2004). In recent years CIs have become commonplace and can now be found all over the world in a multitude of industries (Müller et al., 2012). For example, Sölvell, Lindqvist & Ketels, (2003) identified over 500

CI's, predominantly in developed economies (Europe and North America). Their eventual 238 respondents consisted of a "broad range of technology areas" (Sölvell, Lindqvist & Ketels, 2003, pp10).

In terms of membership, Lämmer-Gamp, zu Kôcker & Christensen (2011) found that higher concentrations of economic actors increase the effectiveness of CI operation, especially when concerning SME's. This view is held by most cluster authors including, for example, Sölvell, Lindqvist & Ketels (2003); Andersson et al. (2004); and Müller et al. (2012). Furthermore, Sölvell, Lindqvist & Ketels (2003) note that CI's should include the international sphere and refrain from limiting membership as this is proven to be less successful.

Optimally, CI membership should include all potential stakeholders in the cluster region (Lämmer-Gamp, zu Kôcker & Christensen, 2011), including actors in the main value chain, ancillary and supporting activities, the public sphere, academia, other CI's, international agents, and private IFCs. The focus of membership should be on participation by all actors, creating a strong network within the cluster region (Lämmer-Gamp, zu Kôcker & Christensen, 2011). However, given the diverse nature of clusters the optimal cluster membership depends on the unique nature of the specific CI at hand (Sölvell, Lindqvist & Ketels, 2003).

In the past decade much effort has been spent to analyse CI's and determine the best practice for success. Various CI benchmarking studies (see for example: Sölvell, Lindqvist & Ketels, 2003; Müller et al., 2012; and Lindqvist, Ketels & Sölvell, 2013) have empirically determined that CI's vary extensively in size, sources of funding, organisational structure, available resources, membership and legal status. Due to their wide scope and adaptability, it has been observed that CI's maintain a diverse set of operational objectives and activities (Teigland & Lindqvist, 2007; UNIDO, 2010; Oxford Research, 2011; Lindqvist, Ketels & Sölvell, 2013). From a list of more than 25 frequently observed CI objectives (identified in the *Global Cluster Initiative Survey 2003)* Sölvell, Lindqvist & Ketels (2003. pp.11) formulate a list six overarching objectives most often included in CI mandates.

- **Research and networking** objectives are aimed at improving R&D and innovation through efficient networking in order to benefit from knowledge spill overs. Networking also improves cooperative capabilities.
- **Policy action** involves joint lobbying of government by cluster members, where policies that affect industry as a whole can be jointly discussed with government.
- Improvements in **commercial cooperation** between cluster members to increase networking, knowledge sharing and generate economies of scale and scope.

- **Education and training** objectives are aimed at skills development and bolstering innovative capability.
- A focus on improvements in **innovation and technology** drives development and the creation and maintenance of a regional competitive advantage.
- Finally, **cluster expansion** and growth is achieved through improved competition, cooperation and innovation.

Benchmarking studies have shown that successful CI's often maintain multiple objectives (Sölvell, Lindqvist & Ketels, 2003). Furthermore, innovation is considered a key value driver in the clustering process (Porter, 1990, 2000) and is often a key CI objective (Sölvell, Lindqvist & Ketels, 2003), especially in developed economies (Ketels, Lindqvist & Sölvell, 2006). Similarly, Lämmer-Gamp, zu Kôcker & Christensen (2011) state that CI's should focus on competition through the promotion of knowledge based growth and the creation of commercialisable R&D developments.

In terms of governance, benchmarking studies have found that the private sector is more influential in CI governance (Sölvell, Lindqvist & Ketels, 2003; Müller et al., 2012; Lindqvist, Ketels & Sölvell, 2013). However, successful CIs usually involve a board with representatives from all the main spheres (industry, government, academia, finance) as well as a full-time management official (or facilitator) responsible for everyday activities (Sölvell, Lindqvist & Ketels, 2003; OCED, 2010). In more mature clusters this management role is frequently formalised and incorporated as a stand-alone entity, called a CMO (Lämmer-Gamp, zu Kôcker & Christensen, 2011; Melax, 2013). The CMO, also known as an anchoring entity (Turner, Monnard, Leete, 2013), bares significant resemblance to the implementing agencies identified by Sölvell (2008).

2.3.3 Cluster Management Organisation

Melax (2013) notes that CMO's are a formalization of the CI facilitator role that commonly involves the incorporation of a stand-alone entity with the sole purpose of managing cluster promotional activity on behalf of the initiative. This author also states that research focus in clustering has shifted from defining clusters and identifying cluster benefits, to cluster creation through policy and promotional measures, and finally to cluster management principles and effective management (Melax, 2013).

Excellent, effective and efficient management of cluster promotional activity is a crucial cluster success factor (Buhl & zu Köcker, 2010; Lämmer-Gamp, zu Köcker & Christensen, 2011; Müller et al.,

2012). For example, an independent evaluation of the United Nations Industrial Development Organisation's (UNIDO) CI program (UNIDO, 2010, pp.xii), specifically states that a "remarkable dimension of efficiency has been the ability of project managers to coalesce highly motivated and well-qualified teams of local professionals and establish operational interaction between local and international experts".

Van Dijk (2012) mentions that the ad-hoc and opportunistic nature of business alliances are amplified by the absence of a formal procedure regarding their initiation and management. The author describes the role of the initiator as one that encompasses more than just the proposal. It includes analysis of the target, presentation of a proposed business model and development of a plan of action into the future. Kinnunen (2010) recognises that, in terms of M&A, the post-acquisition process is a crucial phase during which the envisioned synergies are either realised or lost. Resultantly, the role and actions taken by the initiator, before and during collaboration, may drastically impact the ultimate value of the alliance (Van Dijk, 2012).

Constant, long-term network and infrastructure upgrading is cited as a key factor for cluster management success (Buhl & zu Köcker, 2010). Merely starting a CI is not enough as long term success requires constant adaptations in step with the dynamic business environment and cluster life-cycle (Melax, 2013) and the processes involved with creating unique systems relevant to the specific cluster can take a long time to materialise (Buhl & zu Köcker, 2010). Furthermore, CMO's quite often have diverse operational requirements which necessitate an expansive approach to management activities (Raines, 2002).

However, diverse organisations often lack common goals or values (Blakar, 1984) and members of a collective often have different motivations for joining (Lerpold, 2003). For example, in the CI setting, Teigland & Lindqvist (2007) found significant differences in opinion between private and public sector actors regarding CI effect and operations. Their evaluation determined that the public sector generally has a higher expectation of overall cluster competitiveness and importance of CI activities. Ultimately, the complex nature of CI's often results in difficulties for creating a sound theory for operational and management practice (Formhold-Eisebith & Eisebith, 2005).

Furthermore, any of a wide range of goals and objectives may be pursued, usually depending on the specific requirements of the CI at hand (Sölvell, Lindqvist & Ketels, 2003). In terms of network management, Buhl & zu Köcker (2010) stress the importance of goal prioritisation by setting easily attainable goals first and moving to more challenging ventures later. The effects on motivation of attaining these initial goals are viewed as significant in generating positivity surrounding the cluster

movement (Buhl & zu Köcker, 2010). Once CI goals and objectives have been established, the specific cluster services and activities aimed at realising those goals have to be determined (Scheer & von Zallinger, 2007). Cluster services are considered more effective if more diverse and frequent (Lämmer-Gamp, zu Kôcker & Christensen, 2011). Acting as facilitator of the CI, services provided by the CMO should be in-line with the objectives of its governing board – i.e. the CI.

2.3.4 Evaluation of Cluster Management

The rationale for cluster management evaluation is to legitimize active involvement by third parties and to improve operations (Oxford Research, 2011; Sölvell & Williams, 2013). Scheer & von Zallinger (2007) note that researchers and practitioners have increasingly come to realise the benefit of cluster management evaluation in generating much needed information for improving operations. During the early 1990's, *Porter's Diamond* (Porter, 1990) was extensively used as a method of expressing, describing and evaluating cluster mechanics. However, with wide spread adoption of the cluster concept and emergence of active third party promotional practices, a need to evaluate the effectiveness of cluster policies, programs and other forms of promotion arose (Sölvell & Williams, 2013).

Diez (2001), drawing from both the regional development and public policy evaluation literature streams, evaluates the application of traditional (objective and quantitative) evaluation methods and is of the opinion that these approaches do not account for the unique characteristics of the cluster development process. This author mentions the importance of social (as opposed to physical or human) capital as a modern driver of economic growth. Furthermore, he asserts that the creation of a cohesive social network involved with the clustering process is facilitates the development of valuable social capital resources (Diez, 2001). He recommends the development of assessment models that further facilitate learning and knowledge spill-overs, but which can also continually adapt to new competitive conditions (Diez, 2001).

With regards to an appropriate method of evaluation for cluster support, Sölvell (2008) specifically mentions the complexity of cluster management evaluation as a multi-dimensional analysis of numerous objectives (cluster expansion, training, collaboration, etc.), which may cover a wide range of activities (workshops, lobbying, joint marketing, etc.), that may impact multiple actors (both directly and indirectly), over an extended time-frame (often decades). Resultantly, it may be difficult to isolate the true value drivers given the complexity and interlinked nature of various cluster policy, cluster programs and CI's all working towards essentially similar goals (Sölvell, 2008; Sölvell &

Williams, 2013). Numerous other authors also refer to the difficulties involved in the cluster evaluation process; network complexity, sheer volume of data, and ever changing business environment are highlighted as factors contributing to this intricacy (Scheer & von Zallinger, 2007; Lämmer-Gamp, zu Kôcker & Christensen, 2011; Lindqvist, Ketels & Sölvell, 2013). Additionally, multiple authors mention the importance of including a development stage (or a lifecycle component) in cluster evaluation as this provides an overview of the potential and preferred objectives of cluster promotional activity (Andersson et al., 2004; Sölvell 2008; Ketels, 2009).

Most comprehensive cluster management evaluation models assume a case study approach and use expansive mixed methods of data collection, due to the high customisability and multiple contextual variables present in the cluster setting. These commonly consist of qualitative surveys and interviews with stakeholders, as well as the analysis of quantitative data (see for example: Sölvell, Lindqvist & Ketels; 2003; Oxford Research, 2011; Sölvell & Williams, 2013; Turner, Monnard and Leete, 2013; Marešováa, Jašíkováb & Burešc, 2014). Quantitative variables used include, amongst others, employment rates, value added growth and competitiveness ratios; whereas qualitative analysis is concerned with the perceived and realised cluster benefits to member firms (Oxford Research, 2011; Sölvell & Williams, 2013).

Furthermore, impact oriented monitoring is a project management tool that is frequently used in cluster evaluations (Scheer & von Zallinger, 2007). The main focus of this method is on factors that the CI can directly influence, specifically those factors that are deemed to be central to obtaining tangible results (Scheer & von Zallinger, 2007). However, the inherent complexity of cluster management activity allows various statistics to be gathered in order to test a multitude of intended clustering effects. Numerous evaluation models have been developed in order to monitor cluster management effects on various distinct levels (Scheer & von Zallinger, 2007; Sölvell, 2008). For example, Teigland & Lindqvist (2007) and Urbančíková & Burger (2014) analyse the private vs. public perspective; whereas Ketels, Lindqvist & Sölvell (2006) assess cluster mechanics in developed vs. transition economies.

Sölvell, Lindqvist & Ketels (2003) developed the *Cluster Initiative Performance Model (CIPM)* which is intended as the first comprehensive analysis of CI activities. The CIPM analyses three main value drivers to infer overall cluster performance: (1) the social, political and economic setting, (2) CI objectives, and (3) the CI process. This wide-ranging focus includes local business environment conditions such as cluster strength (i.e. the dynamics and inter-linkages of the cluster) and level and quality of government involvement as factors in the evaluation process (Sölvell, Lindqvist & Ketels, 2003). Furthermore, the process value driver includes a time element and involves the analysis of six

facets of the CI life-cycle; initiation and planning, governance and financing, scope for membership, resources and the role of the facilitator, framework consensus and building momentum (Sölvell, Lindqvist & Ketels, 2003).

Oxford Research (2011) presents an evaluation model for the Skåne CI's which attempts to include as many cluster related aspects as possible. This evaluation technique first builds a description of the CI (including the cluster value chain, CI goals and the extent of CI activities), includes a process analysis which is conducted in order to determine the frequency of cluster activities and a member survey to determine the views held and experiences felt by cluster member firms (Oxford Research, 2011). The Skåne evaluation model includes a register analysis which collects data on number of employees, net turnover, profit and loss, personnel expenses and productivity (calculated as value added per employee). Additionally, this method evaluates the clusters international outlook by comparing it to an international benchmark constructed from top performing CI's worldwide (Oxford Research, 2011).

Similarly to the *CIPM* and Skåne models presented above, the *Multi-criteria Model* (Marešováa, Jašíkováb & Burešc, 2014) evaluates numerous areas of interest including: performance of member companies, specific cluster activities, cluster management, policies and the performance of the cluster as a whole. Turner, Monnard and Leete (2013) present an evaluation which focuses on short-, mid- and long-term impacts of the CI on its constituent cluster. The aim of this evaluation is to access CI services and to determine their effect on participating entities (Turner, Monnard and Leete, 2013).

Sölvell & Williams (2013) present the Cluster Observatory Evaluation Model. This comprehensive analysis method builds on three key pillars, the first of which is an analysis of innovation gaps. This involves the evaluation of the various inter-linkages within the cluster. According to Sölvell & Williams (2013) there are five main "internal gaps" (avenues of interaction) that promote innovation and growth in clusters; firm-to-research, firm-to-university, firm-to-capital, firm-to-government, and firm-to-firm. One of the main aims of the CMO is the facilitation of dialogue between cluster members. Analysis of innovation gaps allows for a survey based evaluation of the development of these inter-linkages.

The process proposed by Sölvell & Williams (2013) includes performance surveys which focus on the expectations of member firms, results experienced by member firms and suggestions by member firms to CMO activities. Six main measures are analysed: sustainability, integration, equality, new and better products and services produced, increased employment and sales increases (Sölvell &

Williams, 2013). The authors use financial performance data which allows for comparisons between member firms, control groups of firms in the same region, and firms in similar industries not party to the cluster. Four key performance measures are analysed in the financial evaluation, including value added growth, profitability, wages per employee and competitiveness. In this view, competitiveness is determined based on value added per capital and value added per labour unit (Sölvell & Williams, 2013). Furthermore, value added in the cluster is the sum of value added by all member firms and value added is a product of the utilization of capital and labour. According to this logic, clusters are considered competitive when they utilize fewer resources than the value added and uncompetitive if they use more resources than value added (Sölvell & Williams, 2013)

Part B: Synergy – Rationale, Sources and Value Calculation with Discounted Cash Flow

Taking a similar approach to cluster management impact valuation as maintained by Sölvell & Williams (2013), i.e. that value added in the cluster is the sum of value added by all member firms, this thesis theorises that the value of a CMO can be determined as its contribution to the generation of synergy between CI participants. This section reviews the existing business alliance literature and determines the fundamentals of the synergy valuation process.

2.4 Synergy

2.4.1 Rationale for Collaboration

Business synergy is the notion that multiple businesses can, in cooperation, achieve greater shareholder wealth and value creation due to the presence of mutual benefits arising from the cooperative alliance (DePamphilis, 2011). This greater value potential exists due to opportunities that would not have been available to firms acting independently (Damodaran, 2005). Businesses alliance transactions may take any of a number of legal forms (e.g. mergers, consolidations, acquisitions, joint ventures, licencing deals, etc.) and the factors that impact the potential for synergy are numerous (DePamphilis, 2011; De Graaf & Pienaar, 2015).

M&A are identified as transactions that involve the consolidation of two or more legal entities into a single new entity (Roberts, Wallace & Moles, 2003; DePamphilis, 2011). JV are collaborative transactions where two or more partner firms enter a mutually beneficial business arrangement, but retain their individual corporate identities (Pape & Schmidt-Tank, 2004). Both of these forms of business alliance seek to generate greater value (i.e. synergy) through the process of collaboration.

Shareholder wealth creation is often assumed to be the primary objective of business (Bainbridge, 1993). In line with this assumption, the primary rationale of any collaborative activity is value creation through the formation of mutually beneficial opportunities and exploitation of increased efficiencies (Ross et al., 2002). Lasker, Weiss & Miller (2001) develop a synergy analysis framework and identify the main determinants of synergy value. In this view resources make up the fundamental building blocks of synergy and include physical (factors of production, money, equipment, human resources) and intangible (skills, information, network connections) elements.

According to Roberts, Wallace & Moles (2003), there are numerous reasons that are regularly provided by managers for engagement in collaborative activity including: (1) the achievement of specific strategic objectives, (2) speculation, (3) financial necessity, (4) political motives, (5) and management failure. These authors also state that strategic rationales and legal form of collaboration are informed by a multitude of different firm-level operational factors. These factors include access to a specific skill or resource, the effect of globalization and diversification, industry pressures, scope for vertical integration, and access to new markets (Roberts, Wallace & Moles, 2003).

Furthermore, Lasker, Weiss & Miller (2001) note that the level and quality of leadership and administration as well as good inter-partner relationships, built on trust and respect, promote effective collaboration and realisation of synergy. The impact of managers and the process of integration are also noted by De Graaf & Pienaar (2015). These authors cite Larsson & Finkelstien (1999) who found that organisational integration was the single most important factor for synergy realisation. Finally, external factors such as the social, historical, and public sphere have a significant impact on the potential for synergy in collaboration (Lasker, Weiss & Miller, 2001).

2.4.2 Identification of Synergy Sources

Numerous authors, including Evans & Bishop (2001); Damodaran (2005); and DePamphilis (2011) draw a distinction between synergy arising from operational and financial sources. Damodaran (2005, pp32) presents a graphical breakdown of synergy sources and their relation to value (Figure 4).

Operating Synergies – Cost/Efficiency & Revenue Enhancement

Operating synergy includes all value benefits that arise due to operational similarities between participating firms (DePamphilis, 2011). Damodaran (2005) identifies strategic advantages (revenue based) and economies of scale (cost/efficiency based) as elements of operational synergy. This distinction between cost- and revenue-based synergies is also noted in the discussions presented by DePamphilis (2011) and Evans & Bishop (2001). De Graaf & Pienaar (2015), citing Ansoff (1965) and Gaughan (2007), also draw this distinction and attribute the presence of cost synergy to the existence of efficiencies, whereas revenue synergies result from the impact of market collusion.

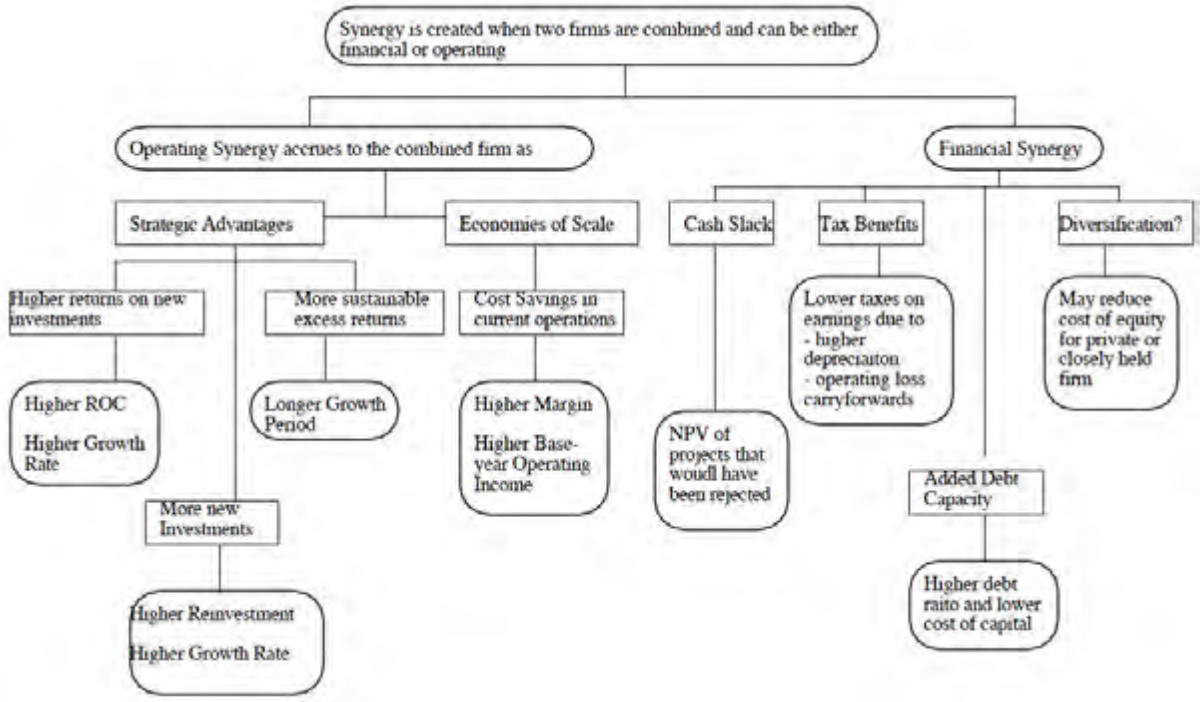

Figure 4: Synergy and Value

(Source, Damodaran, 2005, pp. 32)

Cost synergies, resulting from operational efficiencies, are defined as increased production over fixed costs (DePamphilis, 2011). Damodaran (2005) related these sources to the ability to operate at a greater margin and the ability to generate a greater operating income. Ross et al. (2002) identifies economies of scale, economies of vertical integration and use of complementary resources as key cost synergies. Eccles, Lanes & Wilson (1999) identify cost savings synergies (including economies of scale, economies of scope and divestures) as arising from operational sources. The same notion is presented by Kinnunen (2010) who maintains that asset divesture drives cost synergies. Pape & Schmidt-Tank (2004) specifically mention the value of the learning effect and the value of the ability to secure access to a key skill or resource through cooperation. Furthermore, De Graaf & Pienaar (2015), citing De la Mano (2002), differentiates between static and dynamic efficiencies. In this view, static efficiencies exist and provide benefit at a given point in time, whilst dynamic (or innovation) efficiencies translate to long term improvements in technology or operational process.

Revenue synergies result from increased bargaining power, which may arise through increased size or market presence, decreased competition and/or better utilisation of knowledge and skills (Damodaran, 2005). This translates into a higher return on current investments, more new

investment opportunities and greater growth period yielding more sustainable returns. Pape & Schmidt-Tank (2004) note that increased bargaining power results from the utilisation of different combinations of functional strengths. Kinnunen (2010) maintains that changes in resource deployment contribute to revenue synergies. Eccles, Lanes & Wilson (1999) note that revenue enhancement synergies arise through delivery of superior or complimentary products to a larger distribution network. In their view process improvement synergies occur through knowledge sharing when best practices and core competencies are adopted by partner firms (Eccles, Lanes & Wilson, 1999). Ross et al. (2002) also identifies revenue synergies as those related to marketing gains and increased market power. Additionally, these authors note that strategic benefits (e.g. greater management flexibility or competitive advantage) also account for revenue enhancements. However, they continue to state that "strategic benefit is more like an option than a standard investment opportunity" (Ross et al., 2002, pp.8).

Financial Synergy

Eccles, Lanes & Wilson (1999) identify financial synergies (or financial engineering synergies) as those effects that involve the altering cost of capital through the acquisition process. Damodaran (2005) identifies that the diversification effect may have a financial benefit to participants. In terms of M&A, DePamphilis (2011) ascribes the reduction in cost of capital to a decreased variance of returns in the combined entity provided that returns between partners, before the transaction, are uncorrelated. Furthermore, Damodaran (2005) mentions the coinsurance effect in which the decrease in returns variance attributable to diversification may also result in an increased debt capacity.

Eccles, Lanes & Wilson (1999) divide potential tax synergies into tax structuring, which involves avoiding one-time tax payments, and tax engineering, which involves structuring the combined entity to decrease tax expense. Ross et al. (2002) comment on the potential for tax reductions resulting from M&A transactions. Synergy arising from cash slack (or surplus funds) involves a high liquidity entity (with few investment prospects acquiring) acquiring a cash restricted firm (with high investment potential). Similarly, the M&A transaction can grant either party access to spare debt capacity in the other. Both of these impacts may yield tax benefits to participants (Ross et al., 2002). Additionally, Damodaran (2005) identifies tax benefits as the utilisation of taxable losses as a tax shield in a consolidation, increased depreciation resulting from the recapitalisation of assets and tax benefits arising from the purchase of the target company.

However, financial synergies are often dependent on the sales transactions involved in the M&A process and do not frequently appear with the same prevalence in other forms of business alliance transactions such as JV (Pape & Schmidt-Tank, 2004). Ultimately, if synergy value is calculated in the DCF model, financial synergies represent all those effects that may change the discount rate applied (e.g. WACC).

2.4.3 Potential for Dis-synergy

Synergy is generally thought of as positive value contributions; however, numerous authors remark on the potential for collaboration to result in value losses (Damodaran, 2005; Van Dijk, 2012; Bhatia, 2013; De Graaf & Pienaar, 2015; Garzella, 2015). Dis-synergies predominantly arise due to unforeseen decreases in efficiency or costs required to achieve collaboration (Van Dijk, 2012). Dis-synergies are especially prevalent in the case of larger organisations where more unforeseen factors may be at play (Bhatia, 2013).

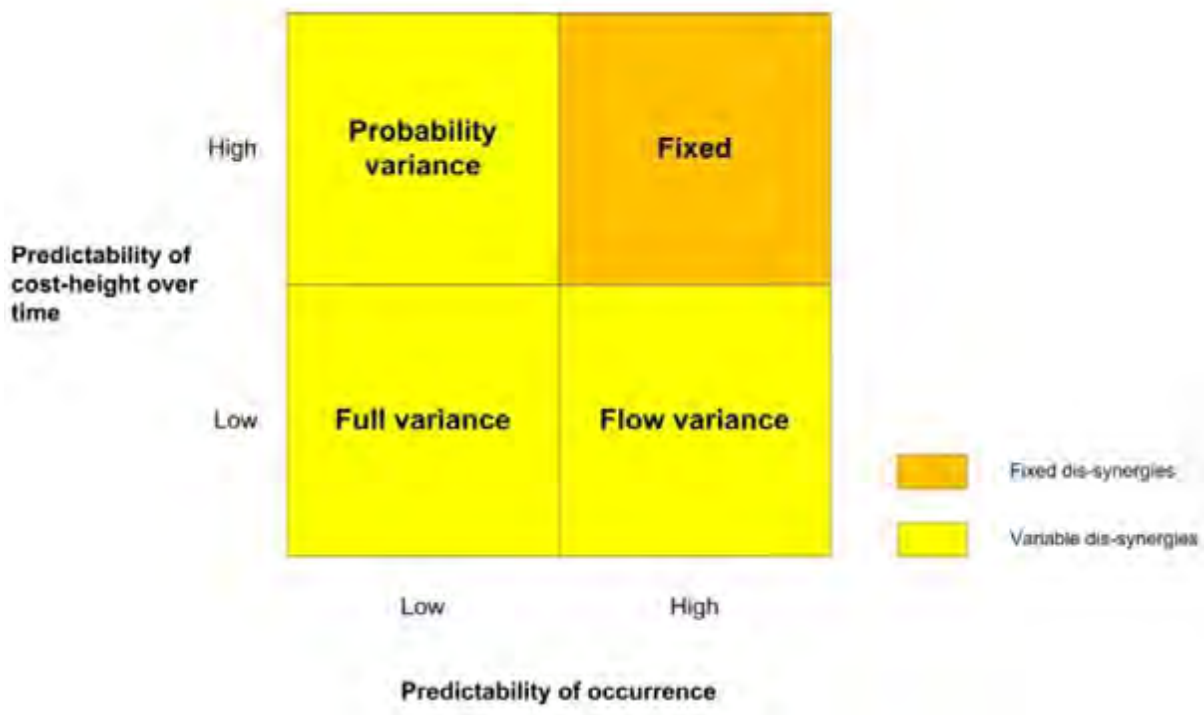

Figure 5: Types of Dis-Synergy

(Source: Van Dijk, 2012, pp.49.)

Van Dijk (2012) distinguishes between variable and fixed dis-synergies (Figure 5). In this view fixed dis-synergies are defined as negative impacts with high probability of occurrence and predictability

of value/cost. The impacts of these sources are difficult to negate. On the other hand, variable dis-synergies are described as value reducing effects that can be altered post-merger, either due to low probability or low cost (Van Dijk, 2012). Van Dijk (2012) recommends that dis-synergies have to be identified, managed, and minimised in order to maximise the positive value effect of synergy due to collaborations.

2.4.4 Synergy Valuation

As mentioned before, business synergy is the greater value potential that accrues to cooperating entities (Damodaran, 2005). The logical question that follows is: By how much?

In their synthesis of leading valuation practices for M&A transactions, De Graaf & Pienaar (2015, pp.151) note that certain synergy valuation practices are not specific to one rationale or driver, but form part of a common tool kit which is applicable to numerous sources. For example, De Graaf & Pienaar (2015) cite the 'outside-in approach' as presented in McKinsey & Co. (2005) which analyses synergy gains relative to an industry adjusted benchmark. Furthermore, De Graaf & Pienaar (2015) cite the approaches developed by Evans & Bishop (2001) and Damodaran (2005), both of which utilise the DCF valuation method to determine the value of synergy as the difference in the sum of participant value, before and after the collaboration. Variants of the DCF approach, as exhibited by Damodaran (2005) and Evans & Bishop (2001), have also been applied by amongst others: Silvije and McClure (2013), Ross et al. (2002), Malucha (2009) and Chaplinksy, Schill & Doherty (2000).

Damodaran (2005, pp.6) sets out by asking two questions:

1. What form is synergy expected to take?
2. When will synergy start affecting cash flows?

The first question involves the identification of the various sources of synergy. Secondly, as the entire effect of integration and cooperation is unlikely to materialize overnight, the timing of changes in cash flows is an important consideration for value determination (Damodaran, 2005). Evans & Bishop (2001) ask a similar set of questions by determining the size and timing of the cash flows related to synergy sources, but also notes the importance of assessing the probability of the cash flow effect. A point of interest is the recommendation of a conservative outlook in making estimations about the size and timing of cash flows related to synergy (De Graaf & Pienaar, 2015).

According to Damodaran (2005) synergy is calculated as the value of the combined entity (including the estimated effect of potential synergy, excluding the value of control) less the sum of the

expected values of the two firms had they remained independent (Equation [2.1]). Adhering to the principal of parsimony (Damodaran, 2006), the simplest way to capture the synergy effect is a two party consolidation (M&A),

$$\Delta V = V_{at} - (V_a + V_t), \qquad [2.1]$$

where, ΔV = Value of synergy,

V_{at} = Value of the combined entity,

$(V_a + V_t)$ = Value of the two stand-alone entities combined.

Stand-alone cash flow projections (V_a & V_t) exclude synergy sources and effects (Chaplinksy, Schill & Doherty, 2000). As explained by these authors, valuations based on stand-alone data provide useful information as to the target firm's capabilities and bargaining power at the negotiation table.

Furthermore, the cost of dis-synergies, as described by Van Dijk (2012), should also be estimated and subtracted from the value of positive synergies (Equation [2.2]). This author proposes the inclusion of an additional term in the standard synergy valuation formula, which reflects the impact of integration costs and dis-synergies,

$$\Delta V = V_{at} - (V_a - V_t) - IC, \qquad [2.2]$$

where, IC = integration and dis-synergy costs.

The final price paid by the acquirer in a merger or acquisition transaction is an important factor in determining the ultimate value of synergy obtained (Malucha, 2009). The value of the target company to the acquirer is increased by the potential for synergy between them (Ross et al., 2002). As such, the value of the target to the acquirer is equal to the sum of its intrinsic value and synergy potential (Equation [2.3]),

$$V_t^* = \Delta V + V_t, \qquad [2.3]$$

where, V_t^* = Value of target to acquirer,

ΔV = Value of synergy,

V_t = stand-alone value of the target.

It follows that if the target company can be obtained for a price less than V_t^*, the consolidation will result in positive value creation for the acquirer's shareholders (Ross et al., 2002). If the acquiring

firm pays a premium equal to the value of synergy available, all value from the transaction accrues to the target shareholders (Chaplinksy, Schill & Doherty, 2000).

Due to the preservation of the unique identities of the entities involved in a JV transaction (Sercu & Uppal, 1993), these transactions more accurately resemble the legal form of clustered business activity. Sercu & Uppal (1993) develop a profit sharing framework for JV contracts. JV transactions are generally calculated on investment bases, instead of full company value as was the case with M&A. In terms of DCF, this amounts to JV synergy calculation with reference to the Net Present Value (NPV) of the investment in the JV. Synergy, as stated by Sercu & Uppal (1993), is the difference in the NPV of the JV and the sum of the NPV of capital allocations of parent firms,

$$\Delta V = NPV_{JV} - (NPV_A + NPV_B), \quad [2.4]$$

where, ΔV – Value of Synergy,

NPV_{JV} – Net Present Value of the Joint Venture,

NPV_A - Net Present Value of Parent A's investment,

NPV_B - Net Present Value of Parent B's investment.

Pape & Schmidt-Tank (2004) use real options to value JV contracts. Citing Contractor & Lorange (1988), these authors state that JV arrangements are mutually value creating (i.e. have positive synergy) when the net benefit of the venture, to an individual company, is greater than the opportunity cost of participation. Pape & Schmidt-Tank (2004) provide Equation [2.4] and relate the opportunity cost of the JV to the percentage of profits given up to partner firms,

$$B_x - C_x > (1 - \propto_x) P_{JV}, \quad [2.5]$$

where, B_x – Value of benefits to company X (PV of cashflows),

C_x – Value of costs to company X (PV of cashflows),

$\propto_x$ – Equity stake in the alliance/joint venture of company X,

P_{JV} – Profits generated by the alliance/joint venture.

The $(B_x - C_x)$ term represents the net benefit available to company X through participation in the JV. This net benefit may include cash and non-cash flow elements. Under the assumption that the individual company (X) could accept the project alone, the $(1 - \propto_x) P_{JV}$ term represents the opportunity cost of collaboration - i.e. profit share forgone under the JV agreement. If an entity

cannot benefit enough from synergies for the net benefit to outweigh its opportunity cost of participation, it will not join the collaboration in the JV (Pape & Schmidt-Tank, 2004).

2.5 Discounted Cash Flow Valuation Model for Synergy Value Calculation

2.5.1 The Basic Discounted Cash Flow Valuation Model

It would be difficult (if not impossible) to estimate the investment potential of a financial instrument (such as an entity, investment or business project) with no concept of intrinsic value and how prices might behave (Damodaran, 2006). This author states that financial valuation models have different strengths and weaknesses and no absolute method of valuation exists; in other words, the primary focus of any financial valuation is to determine the best estimate of the intrinsic worth of an asset, equity or debt instrument (Damodaran, 2006).

Financial models are frequently adjusted to account for the specific need of particular instruments. For example when valuing M&A transactions, special considerations for synergy and control are included, which increases model complexity (Ross et al., 2002; Damodaran, 2005). Furthermore, in addition to the availability of numerous models to select from, the analyst quite often also faces the numerous uncertainties involved in the process of estimating the impact of future events and conditions on the instrument being valued (Suhonen, 2014). Synergy valuation techniques that have been illustrated in the literature include: DCF valuation (e.g. Ross et al, 2002; Damodaran, 2005; Malucha, 2009), market equity models (e.g. Jones & Danbolt, 2004; Barker, Pan & Wurgler, 2009), and real options valuation (e.g. Pape & Schmidt-Tank, 2004; Kinnunen, 2010).

DCF valuation is one of the most commonly used financial modelling techniques, due to its sound fundamentals and relative ease of use given modern computing technology (Damodaran, 2006). The primary assumption of DCF is that investments are made in order to generate cash flows in the future and posits that the value of an asset or investment is a function of the cash flows it is expected to generate in the future (Damodaran, 2006; Torrez, Al-Jafari & Juma'h, 2006).

This fundamental notion of value can be applied to numerous asset or investment classes and multiple variants of the basic DCF have been developed (Damodaran, 2006). The most commonly used variant of DCF is the risk-adjusted discount method, due to the incorporation of risk into the

DCF model by using higher discount rates to reflect higher risk (Damodaran, 2006; Murugesan, 2013).

Under this (risk-adjusted) assumption the value of an asset or financial instrument is equal to the present value of all its expected future cash flows, discounted at a rate that reflects the uncertainty attached to that series of cash flows (Torrez, Al-Jafari & Juma'h, 2006; Murugesan, 2013),

$$Value = \frac{E(CF_1)}{(1+r)} + \frac{E(CF_2)}{(1+r)^2} + \frac{E(CF_3)}{(1+r)^3} + \cdots + \frac{E(CF_n)}{(1+r)^n}, \qquad [2.6]$$

where, n = Life of the asset,

$E(CF_t)$ = Expected cash flow in period t,

r = Discount rate reflecting riskiness of expected cash flows.

The risk adjusted discount method is grounded in the fact that the time value of money and uncertainties regarding future conditions have consequences on the perceived value of an investment (Van Dijk, 2012; Suhonen, 2014). It follows that investments with high (low) and predictable (volatile) cash flows are more (less) valuable (Damodaran, 2006).

However, Damodaran (2006) mentions that unlike regular investments, business entities consist of two distinct asset classes. Assets-in-place are described as the existing assets the business owns and uses to generate profits. These assets have determinable lifetimes and are relatively easy to value with a basic DCF model. The second asset class identified by Damodaran (2006) is growth-assets. These represent the potentially profitable investments that the business can make in the future. Growth-assets are much harder to identify and value due to their dependence on the occurrence (or non-occurrence) of profitable future investments (Damodaran, 2006).

2.5.2 The Multi-Period Discounted Cash Flow Valuation Model

The risk-adjusted DCF model can be adapted for a variety of assets, financial investments, and business or equity valuations (Torrez, Al-Jafari, Juma'h, 2006). Damodaran (2006) and Torrez, Al-Jafari, Juma'h (2006), mention Miller & Modigliani's (1958) theory and their revolutionary premise that debt and equity forces were partners in supplying capital in order to finance business operations. This implies that the cost of doing business can be inferred from the required returns demanded by both equity and debt holders. Resultantly, Miller & Modigliani (1958) are credited as

the first to present the idea that the intrinsic value of a firm can be calculated by discounting its after tax operating cash flows relative to this equity and debt based cost of capital (Damodaran, 2006).

The multi-period cost of capital approach to DCF determines the value of a business entity by discounting the free cash flows attributable to the firm at a rate that reflects the riskiness of firm cash flows, i.e. the weighted average cost of capital (Torrez, Al-Jafari, Juma'h, 2006),

$$Firm\ Value = \sum_{t=1}^{t=\infty} \frac{FCFF_t}{(1+WACC)^t}, \qquad [2.7]$$

where, $FCFF$ = Free cash flow to firm,

$WACC$ = Weighted average cost of capital,

t = time period.

Furthermore, the perpetuity assumption affects the valuation of business entities – i.e. businesses are expected to have infinite lifetimes (Chaplinsky, Schill & Dorethy, 2000; Torrez, Al-Jafari, Juma'h, 2006). The effect of this is generally included in the financial valuation by means of a terminal value component added to the final year of discounting.

Use of this terminal value component, in addition to explicit cash flows and discount rates during the forecast period, is commonly referred to as the multi-period DCF model (Chaplinsky, Schill & Dorethy, 2000; Torrez, Al-Jafari, Juma'h, 2006). The multi-period DCF model computes present value over the entire indefinite life of the entity (Chaplinsky, Schill & Dorethy, 2000) where the life of the entity is divided into two phases, a forecast period and the terminal value component,

$$Firm\ Value = \sum_{t=1}^{t=n} \frac{FCFF_t}{(1+WACC)^t} + \frac{Terminal\ Value}{(1+WACC)^n}, \qquad [2.8]$$

where, $FCFF$ = Free Cash Flow to Firm,

$WACC$ = Weighted Average Cost of Capital,

g = Growth Rate,

n = Life of the Asset.

2.5.3 Free Cash Flow to Firm

Free cash flow to firm (FCFF) represents the total cash flow amount attributable to bondholders, common stockholders and preferred stockholders of a business and is an estimate of cash flows generated by the entity (prior to debt and preferred dividend payments), obtained by deducting net investment needs from after-tax operating income (Damodaran, 2006).

FCFF is calculated by using earnings before interest and tax, then adjusting for the effective marginal tax effect, non-cash charges, and reinvestment cost (Chaplinksy, Schill & Doherty, 2000),

$$FCFF = EBIT(1 - t) + NCC - Capex - \Delta WC, \qquad [2.9]$$

where, $FCFF$ – Free cash flow to firm,

$EBIT$ – Earnings before Interest and Tax,

t – Effective Tax Rate,

NCC – Non-Cash Charges,

$Capex$ – Capital Expenditure,

ΔWC – Changes in Working Capital.

Chaplinsky, Schill & Dorethy (2000) mentions that financial impact should reflect expected incremental operating cash flows attributable to the transaction. Synergy is calculated as the difference in value of participants between two performance scenarios. Ross et al. (2002) demonstrate how synergies impact incremental cash flows,

$$\Delta CF = \Delta Revenue - \Delta Costs - \Delta Tax - \Delta Capital\ Requirements. \qquad [2.10]$$

Revenue enhancement, cost reduction, lower taxes and reduced capital requirements are key cash flow components that can be affected by synergy (Ross et al., 2002). The authors elaborate on this claim and explain that marketing gains, strategic benefits and increased market power can increase revenues. Economies of scale, economies of vertical integration and use of complimentary resources improve cost efficiencies. Tax benefits take the form of net operating losses used as a tax shield or spare debt capacity to increase interest for the same purpose. Reductions in capital requirements result from operational and financial correlations that translate to increased asset efficiency (Ross et al., 2002).

Furthermore, in terms of an ex-ante approach to determining synergy, Damodaran (2006) states that estimates should take into account synergy sources identified, but should also consider business strategy, industry and economic conditions.

2.5.4 Forecast period

The forecast period covers the time for which explicit periodic forecasts of cash flows and related discount rates are used in the valuation (Damodaran, 2006). The forecast period should be sufficiently long to capture transitional effects of the collaborative event (Jennergern, 2006). According to this author, who extends the methodology of Koller et al. (2005), the expected life of PPE assets is a suitable proxy for the duration of the forecast period (Jennergern, 2006). The standard practice is to assume a forecast period of five to ten years (Malucha, 2009)

Alternatively, Chaplinsky, Schill & Dorethy (2000) assume that the forecast period should be equal to the duration of time which a competitive advantage (due to collaboration) is maintained. In this view, competitive advantage is defined as the situation where return on net assets (RONA) is greater than the weighted average cost of capital (WACC) which coincides with the cash flows that are considered value creating. Chaplinsky, Schill & Dorethy (2000) use RONA due to its convenient link with earnings power ($\frac{NPAT}{Sales}$) and asset efficiency ($\frac{Sales}{Net\ Assets}$) value drivers,

$$RONA = \frac{NPAT}{Net\ Assets}, \qquad [2.11]$$

where, $RONA = \frac{NPAT}{Sales}\ x\ \frac{Sales}{Net\ Assets}$,

$NPAT$ = Net Profits after Tax.

2.5.5 Terminal Value

A terminal value is added in the final year of the forecast period to reflect the perpetual continuation of business (Chaplinsky, Schill & Dorethy, 2000). The terminal value, due to its long term future outlook, is where analysts confront uncertainty the most directly (Damodaran, 2006). Furthermore, due to its perpetual nature, the terminal value component of DCF can constitute a large portion of firm value (Chaplinsky, Schill & Dorethy, 2000). These authors note that care should be given to the calculation of terminal value, especially when the forecast period cash flows are close to zero as a result of aggressive reinvestments.

Even though zero-growth approaches have also been used (Torrez, Al-Jafari & Juma'h, 2006), the terminal value is often characterised by the steady state assumption and interpreted in terms of constant growth (Jennergern, 2006). This approach assumes that cash flows in the post horizon period grow by a constant value, satisfying the necessary condition for infinite discounting (Jennergern, 2006). Damodaran (2006) applies a similar reasoning and highlights two requirements for the application of the constant growth method. First, the assumed growth rate has to be less than the weighted average cost of capital. Secondly, the characteristics of the firm have to bear a resemblance to conditions that are generally associated with constant/stable growth. The constant growth formula, as applied by Chaplinsky, Schill & Dorethy (2000), results in the following terminal value calculation,

$$TV = \frac{FCF^{SS}}{(WACC - g)}, \qquad [2.12]$$

where, FCF^{SS} – steady state free cash flow in the first year after the forecast period,

$WACC$ – Weighted Average Cost of Capital,

g – expected annual growth of FCF^{SS} in perpetuity.

Chaplinsky, Schill & Dorethy (2000) note that setting the growth rate equal to the risk free rate assumes that the company grows at the same rate as the economy. Alternatively, the authors mention that if growth is set equal to inflation there is an expectation of constant rate of operating returns.

According to Damodaran (2006), there are three generic methods of determining constant growth including (1) use of historic growth rates, (2) obtaining estimates from more informed sources, or (3) determining growth based on reinvestment. Historic growth rates are easy to determine, but may be a bad representation of future conditions. Alternatively, obtaining more informed estimates involves assessing what managers and other, more informed, analysts believe growth to be. The final method derives a growth proxy, based on the observed reinvestment rate and return on capital of new investments. This fundamental growth rate is preferred due to its inclusion of the effects of investments made to sustain growth (Damodaran, 2006).

Furthermore, the calculation of a terminal value requires, in addition to a growth estimate, an estimation of the steady state free cash flow - i.e. the periodical cash flow at time (n+1) (Damodaran, 2006). A convenient method to determine this steady state cash flow is to assume that Return on Net Assets (RONA) - i.e. profit margin and asset turnover - remains constant (Chaplinsky, Schill & Dorethy,2000). Alternatively in market multiples, based on public companies with a similar profile as

the target, can also be used to estimate terminal value. However, this method provides a market valuation rather than an inherit value (Chaplinsky, Schill & Dorethy, 2000).

2.5.6 The Discount Rate - Estimations of Cost of Capital

According to Damodaran (2006), the discount rate applied in DCF should be in line with the uncertainty of cash flows; the higher the risk, the higher the discount rate. Additionally, the author maintains that risk can be conceptualised as the variance between expected and actual returns and that this interpretation is frequently used for cost of equity calculations (Damodaran, 2006).

Chaplinsky, Schill & Dorethy (2000) maintain that the discount rate used should reflect the investors' weighted average opportunity cost of investment. Furthermore these authors state that the discount rate should be a forward-looking market-related rate which reflects the riskiness of how capital is going to be spent and not where it has historically come from. The weighted average cost of capital (WACC) is often used as a proxy for business risk (Chaplinsky, Schill & Dorethy, 2000).

In terms of synergy valuation, the discount rate applied when doing both stand-alone and combined valuations is an important consideration (Chaplinsky, Schill & Dorethy, 2000). For the purposes of stand-alone valuations Chaplinsky, Schill & Dorethy, (2000) mention the use of a stand-alone WACC, an industry average or an unlevered beta approach to discount rate calculation for the individual entity. In terms of the combined entity, given that discount rates should reflect the riskiness of the cash flow stream and that the cash flow stream is generated by the combined entity, a WACC based on the combined business risk and capital structure going forward should be used (Chaplinsky, Schill & Dorethy,2000).

According to Van Dijk (2012), Bruner (2004) argues that adjusting cash flows to incorporate risk elements is more prone to bias and error than is adjusting the discount rate. Van Dijk (2012), citing Bruner (2004), provides the following graph to aid in the understanding of the risk-return relationship of synergies (Figure 6).

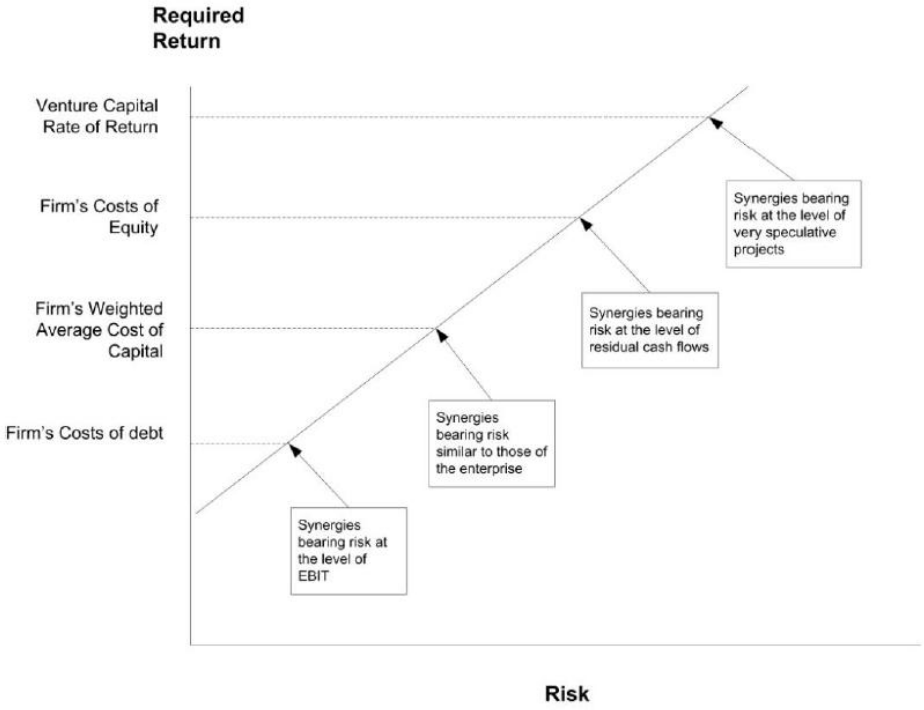

Figure 6: Synergy Discount Rates

(Source: Van Dijk, 2012, pp.44.)

WACC

The sources of capital in business include debt and equity elements; similarly the cost of capital should include equity and debt sources (Chaplinsky, Schill & Dorethy, 2000; Damodaran, 2006). Weighted average cost of capital (WACC) is generally calculated as the cost of capital used in DCF for firm valuations. WACC is calculated by estimating the cost of equity and the after tax cost of debt (borrowings), then calculating the market related weighted average cost of these two sources (Damodaran, 2006; Torrez, Al-Jafari, Juma'h, 2006),

$$WACC = \frac{MV_d}{(MV_d+MV_e)}.r_d(1-t) + \frac{MV_e}{(MV_d+MV_e)}.r_e \ , \qquad [2.13]$$

where, MV_d = Market value of debt,

MV_e = Market value of equity,

r_d = required return on debt,

r_e = required return on equity,

t = effective tax rate.

Chaplinsky, Schill & Dorethy (2000) maintain that the cost of debt can be taken as the yield to maturity that would be demanded on new debt instruments of the same maturity and credit rating. Regarding the cost of equity, these authors note that the risk of an investment should be seen through the eyes of a well-diversified marginal investor and should only include the systematic risk component (Chaplinsky, Schill & Dorethy, 2000).

Determining the cost of equity is much harder than that of the cost of debt and the Capital Asset Pricing Model (CAPM) is frequently used in order to determine the required return (i.e. cost) of equity by relating the returns on equity to that of the return of the market (Damodaran, 2006; Torrez, Al-Jafari & Juma'h, 2006)

CAPM

Sharpe (1964), Linter (1965) and Black (1972) are credited with the development of CAPM, which extends Markowitz's (1952) portfolio theory, describing a linear relationship between the expected rate of return of a security or portfolio and systematic risk (Damodaran, 2006; Torrez, Al-Jafari & Juma'h, 2006). CAPM estimates the required return on equity by relating it to the return on the market through a beta coefficient,

$$E(R_e) = R_f + \beta(E(R_m) - R_f)\,, \qquad [2.14]$$

where, R_f = risk-free rate,

β = Beta coefficient,

$E(R_m) - R_f)$ = Market risk premium.

The market risk premium is determined as expected return on the market ($E(R_m)$) less the risk free rate (R_f) and the rationale is that the expected return on any investment can be obtained by holding first the risk-free investment and adding a premium (Torrez, Al-Jafari & Juma'h, 2006). The beta is a coefficient used to linearly relate the equity risk premium $(E(R_e) - R_f)$ to the market risk premium. This beta coefficient is a measure of systematic risk (Damodaran, 2006) and is determined through regressions of equity returns relative to that of the market (Sigman, 2005; Torrez, Al-Jafari & Juma'h, 2006),

$$\beta = \frac{Cov(R_e,R_m)}{Var(R_m)}\,, \qquad [2.15]$$

where, $Cov(R_e, R_m)$ = covariance of equity and market returns,

$Var(R_m)$ = variance of market returns.

The authors mention that even though CAPM is not particularly accurate in predicting equity returns due to numerous limiting assumptions, beta still widely used as a risk measure (Torrez, Al-Jafari & Juma'h, 2006). Resultantly, in cases where beta is approximated, the return on equity can be computed in the CAPM model.

2.5.7 Criticisms of DCF

The process of valuation with DCF requires the analyst to carefully consider the sustainability of cash flows and associated risks involved (Eccles, Lanes & Wilson, 1999; Murugesan, 2013; Damodaran, 2006). The further into the future estimations have to be made the more uncertain these predictions become, ultimately leading to subjective estimates of value (Murugesan, 2013). Torrez, Al-Jafari & Juma'h (2006) mention that the most frequently used DCF cash flow proxies in business are dividends, free cash flow to firm (FCFF), free cash flows to equity (FCFE), and accounting earnings. The authors mention that these different proxies should fundamentally provide the same valuation result. However, they cite numerous sources detailing empirical evidence to the contrary - i.e. the results obtained between different cash flow proxies vary (Torrez, Al-Jafari & Juma'h, 2006).

Another criticism of the DCF model is that it is considered relatively informationally and computationally heavy when compared to easier methods such as relative valuation (Damodaran, 2006). Numerous assumptions and estimates of cash flows, growth and discount rates have to be made which creates scope for manipulation by the analyst to generate superficial results. As mentioned by Van Dijk (2012), the final value obtained depends heavily on project horizon, timing and amount of cash flows, the discount factor applied and analysts' opinions on these factors. Furthermore, Torrez, Al-Jafari & Juma'h (2006) specifically mention the limiting assumptions of constant growth used in multi-period DCF. Their concerns relate to the fact that WACC can never exceed expected growth.

DCF, if applied objectively, can provide an accurate intrinsic value measure. However, the valuation does not disclose the amount of uncertainty attached to this measure (Suhonen, 2014). Methods such as sensitivity analysis or generating DCF probability distributions by means of Monte-Carlo simulation have been used to address this problem (Suhonen, 2014). Bry & Casta (2003) also note the problems created in valuation resulting from the subjective opinions of analysts in areas of measurement and uncertainty about future events.

2.6 Conclusion

This literature review addresses the cluster concept and its evolution from a geographic and economic phenomenon to a leading management practice (Part A, Section 2.2 and 2.3). Furthermore, Part B (Section 2.4 and 2.5) evaluates the synergy concept and the valuation of synergy within the DCF model. The topics covered in this literature review serve as the fundamental theoretical base from which the valuation framework developed in Chapter 3 is synthesised. Chapter 3 continues by first looking at valuation for M&A and JV and then extending this methodology to the cluster sphere.

Chapter 3: Valuation Framework

3.1 Introduction

The CMO synergy valuation framework developed in this dissertation explores the case for a financial impact assessment of active management in CI. Several authors have expressed a need for further development of cluster and cluster management evaluation models including, UNIDO (2010); Lämmer-Gamp, zu Kôcker & Christensen (2011); Oxford research (2011); and Marešováa, Jašíkováb & Bureš (2014). New evaluation methods for clusters and cluster management activity are continually proposed and developed - see for example: Turner, Monnard & Leete (2013); and Marešováa, Jašíkováb & Burešc (2014).

There are numerous positive benefits that are associated with strong and dynamic clusters including increased efficiencies, higher levels of innovation and a sustainable competitive advantage (Porter, 1990). Regarded as the "oil that lubricates the cluster engine" (Sölvell, Lindqvist & Ketels, 2003, pp23) cluster management activity facilitates cluster development by positively impacting the cluster business environment and advancing its natural evolutionary process through the provision of strategic support services and activities.

Synergy is defined as the phenomenon where multiple businesses can potentially achieve greater value through the process of cooperation and formation of strategic alliances (Kittel, 2007; DePamphilis, 2011). Successful clusters involve mutual value gains through cooperation and business environment development – i.e. synergies. CMO support services and activities advance cluster development and, similar to other business alliance activity (M&A and JV), is fundamentally focussed on the facilitation of cooperation and mutual value creation between multiple participants (Sölvell, Lindqvist & Ketels, 2003; Porter & Emmons, 2003; Ketels & Memedovich, 2008; Lämmer-Gamp, zu Kôcker & Christensen, 2011; Müller et al., 2012; Sölvell & Williams, 2013).

A successful cluster requires dynamic interaction by all the key elements at play in the cluster sphere, including: various stakeholders, links to multiple value chains, the geographic dimension, institutional thickness, level of competition and innovation. Resultantly, potential management activity is extremely diverse, yet highly customizable to the requirements of each individual case. The range of intended management outcomes, as summarized by Sölvell, Lindqvist & Ketels (2003), includes improved research and networking, promoting innovation, advancing technological development, commercial cooperation, education, training, acting as intermediary between public and private sectors, and many more.

Due to this wide scope, some authors including Sölvell (2008), Rocha (2004) and Diez (2001), have expressed caution with the use of economic models for cluster management evaluation. Pure financial evaluations cannot accurately account for all the non-economic (i.e. historical, socio-economic, political & knowledge based) impacts that are associated with strong and successful cluster activity. Concerns also relate to the wide range of potential impacts and divergent expectations of numerous stakeholders involved in the clustering phenomenon (Rocha, 2004).

The use of multiple evaluation criteria has been proposed and demonstrated by numerous authors (e.g. Oxford Research, 2011; Sölvell & Williams, 2013; Turner, Monnard & Leete, 2013). Frequently used test statistics include employment, skills and wage growth, level of innovation, network development, social and environmental impact, competitiveness, financial value, and many more. However, Buhl & zu Köcker, (2010 pp. 18) state that in order for complex business networks, like CI's, to attain success "all activities have to be oriented to market efficiency and profitability." Furthermore, these authors maintain that the success of a business network is deeply dependent on its ability to make value adding decisions (Buhl & zu Köcker, 2010).

Given the cluster phenomenon's industrial fundamentals, the similarity between CMO and other business alliance activity, and the requirement of efficiency and profitability for successful management of complex networks, this framework assumes a financial approach to cluster management evaluation by extending synergy valuation as traditionally associated with M&A and JV transactions. The goal is to determine the financial impact of a CMO on its constituent CI members and to develop a model process that can be used for both financial impact studies and capital budgeting purposes.

The process of developing this framework is accompanied by a case study of the SAFI. The case study was conducted with the aim of developing a more holistic method for synergy valuation by incorporating both theoretical and practical viewpoints. Existing policy and research documents, as well as informal interviews with private sector participants and the interim SAFI cluster manager were used to investigate the case for the valuation of CMO synergy.

3.2 DCF Valuation of Synergy in Business Alliances

3.2.1 Mergers and Acquisitions (M&A) Synergy

M&A transactions are identified as transactions that involve the consolidation of two or more legal entities into a single new entity (Roberts, Wallace & Moles, 2003; DePamphilis, 2011). The value of synergy present in a merger or acquisition transaction can be isolated through an examination of the expected values or participating firms in both the non-collaborative and collaborative scenarios (Ross et al., 2002; Damodaran, 2005). A basic merger and acquisition (M&A) is graphically represented in Figure 7.

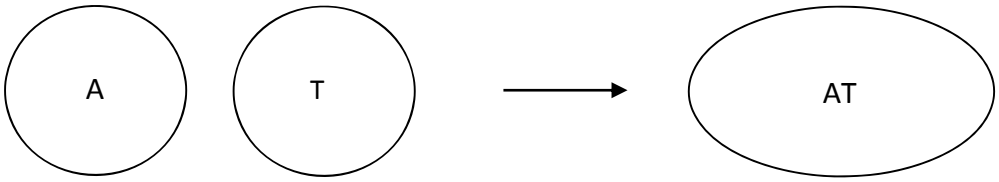

Figure 7: Graphical Representation of Synergy in M&A

(Source: Own Illustration)

The M&A transaction proposes a unification of two entities - the acquirer (A) and the target (T). The arrow represents the collaborative transaction (i.e. the event) that sets apart two mutually exclusive performance scenarios. The scenario to the left hand side of the arrow assumes isolation where companies A and T remain independent. The scenario on the right hand side assumes collaboration and depicts the post-merger combined entity (AT).

Damodaran (2005, pp.47) states that, in order to value synergy, "both the acquiring and target firms have to be valued independently first and the sum of these values can be compared to the value of the combined firm". Equation [3.1], adapted from Ross et al. (2002), calculates M&A synergy (ΔV_M) as the value of participants in the combined post-merger scenario (V_{AT}) less the sum of the value of participants in the isolated scenario ($V_A + V_T$),

$$\Delta V_M = V_{AT} - (V_A + V_T). \qquad [3.1]$$

Even though M&A transactions may assume many distinct legal forms (e.g. statutory or subsidiary mergers), economic perspectives (vertical or horizontal) and may be conducted either as a merger of

equals or a hostile takeover, the one common thread is consolidation, i.e. the unification of distinct entities into a single larger organisation (DePamphilis, 2011). All synergies (ΔV_M) resulting from M&A transactions accrues to this new combined entity. However, depending on the purchase price, synergy gains may not be equally split between the original shareholders of the target and acquiring firms (Ross et al., 2002). A transfer of wealth from the acquirers' to the targets' shareholders will take place if an undue premium is charged for acquisition. As explained by Ross et al. (2002), the acquirers' shareholders benefit from the transaction by not overpaying for the target company,

$$V_A^* = \Delta V_M + V_T. \qquad [3.2]$$

Equation [3.2] calculates the maximum bid price (V_A^*) before an acquisition results in a destruction of wealth for the acquiring shareholders. The maximum bid price is calculated as the stand alone value of the target entity (V_T) plus the value of synergy (ΔV_M) expected from acquisition. Paying the maximum bid price for an acquisition represents a zero sum game for the acquiring shareholders. Equally, if the target company can be obtained for less than this bid price the transaction will result in positive value creation for the acquirer's shareholders (Ross et al., 2002).

3.2.2 Joint Venture (JV) Synergy

JV are collaborative transactions where two or more partner firms enter a mutually beneficial business arrangement (Pape & Schmidt-Tank, 2004). Unlike M&A, both parent entities in JV retain their corporate identity after the transaction. Due to this continued isolated state of parent entities, the synergy of a JV is often calculated in terms of capital employed by each parent and not firm value (Sercu & Uppal, 1993). Although it need not necessarily be the case, for purposes of valuation, it is assumed here that JV collaboration is facilitated by a third-party Joint Venture Entity (JVE) which represents the mutual business venture.

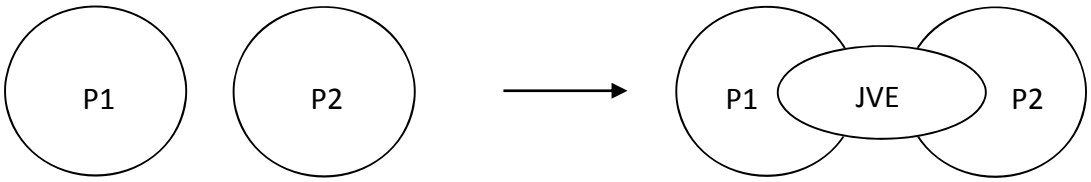

Figure 8: Graphical Representation of Synergy in JV

(Source: Own Illustration)

Figure 8 graphically represents JV collaboration. Similar to the illustration for M&A above, the scenario on the left assumes isolation and the scenario on the right assumes cooperation. In the cooperative scenario the JVE facilitates the joint investment. Equation [3.3] calculates JV synergy (ΔV_J) as the value of the JVE entity (V_{JVE}) less the sum of the value capital invested ($VI_{P1} + VI_{P2}$) by parent firms. The value of capital invested can also be substituted with the value of the next best investment prospect, or opportunity cost of the JV transaction,

$$\Delta V_J = V_{JVE} - (VI_{P1} + VI_{P2}). \qquad [3.3]$$

Equation [3.3] does not address how related costs and benefits are shared between parents. The commonly accepted practice is that each parent controls an equity stake in the JVE which entitles it to a share of JVE profits (Sercu & Uppal, 1993). Assuming rational economic behaviour and the profit/shareholder maximisation approach (Bainbridge, 1993), firms should invest in projects that provide the highest return on capital invested. In other words, a firm will only participate in a JV if expected synergy benefits (net-benefit in collaboration) can outweigh the opportunity cost of participation expected (net-benefit in isolated case),

$$\Delta V_P = (B'_P - C'_P) - (B_P - C_P). \qquad [3.4]$$

Equation [3.4], adapted from Pape & Schmidt-Tank (2004), calculates the difference in value of investment opportunities (ΔV_P) as the net benefit of investment in the JVE ($B'_P - C'_P$) less net benefit of the isolated case ($B_x - C_x$). Even if overall synergy is present in the JV (i.e. $\Delta V_J > 0$), if the individual entity (P) expects a higher net-benefit from other investment opportunities ($\Delta V_P < 0$) that entity (P) is unlikely to participate in the collaborative venture.

3.3 Basic Cluster Management Organisation Synergy Valuation Framework

This section extends the synergy valuation framework as applied in M&A and JV to the cluster management case. The fundamental premise of this synergy framework can be adapted to any form of cluster management activity (e.g. public programme or implementing agencies) which impact the cluster business environment and its actors. However, the accompanying case study of SAFI investigates a CMO in its role as facilitator of a CI. Resultantly, this mode of cluster management was selected to illustrate the synergy valuation framework.

In terms of describing the CMO as a vehicle for developing a strategic alliance, it is assumed the CMO has membership from all main constituent cluster spheres (government, industry, academia, etc.).

This involves a wide stakeholder group, with broad goals and operational objectives. The CMO entity is charged with the facilitation of services and activities aimed at achieving these objectives. Participation in CMO support services and activities by CI members is expected to result in positive benefits on individual actors in the form of cooperative cluster synergies. Similar to the case with a JV transaction, participation in CMO activity does not necessitate destruction of corporate identity and all participants remain independent after the commencement of CMO activity. This is unless, of course, the CMO impact on participants results in a legal merger or acquisition.

Using a similar style of illustration as was presented for M&A and JV (i.e. Figures 7 & 8), the CMO transaction or collaborative event is depicted in Figure 9.

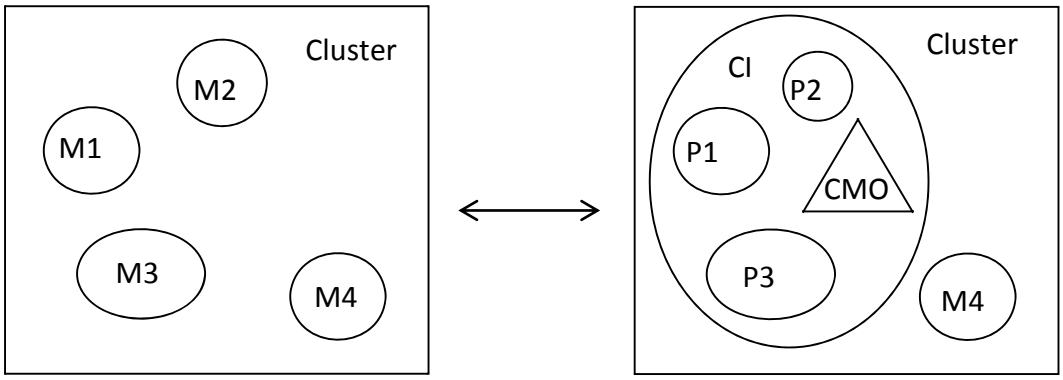

Figure 9: Graphical Representation of Basic CI/CMO Model

(Source: Own Illustration)

The scenario on the left-hand side depicts a cluster, with cluster members (M_i), with no management activity, i.e. the isolated state. The scenario on the right-hand side depicts a cluster with an active CMO driven CI, i.e. the collaborative state. Participation in CMO activity by individual actors is indicated with a change in label from M_i to P_i ($M_1 \rightarrow P_1$; $M_2 \rightarrow P_2$; $M_3 \rightarrow P_3$). Also included in Figure 9 is entity M_4 which represents a cluster member that is not party to CMO-driven collaboration ($M_4 \rightarrow M_4$). M_4 is part of the regional cluster, but not the CI.

Extending the valuation methodology as applied to M&A and JV, the value of CMO synergy is calculated as the difference in value of participants between the collaborative and isolated performance scenarios resulting in the following equation,

$$\Delta \sum V_{CMOi} = \sum V_{Pi} - \sum V_{Mi}', \qquad [3.5]$$

where, ΔV_{CMO} – Synergy attributable to the CMO,

$\sum V_{Mi}'$ - Sum of the value of participants without CMO impact,

$\sum V_{Pi}$ - Sum of the value of participants with CMO impact.

Equation [3.5] states that synergy is present ($\Delta V_{CMO} > 0$) if the sum of the value of participants in the collaborative scenario ($\sum V_{Pi}$) is greater than the sum of the values of those members ($\sum V_{Mi}'$) in isolation. Non-participating entities (M_4 in Figure 9) should be excluded from the valuation in both collaborative and isolated instances. Resultantly, the sum of values in the isolated ($\sum V_{Mi}'$) case should only include those entities that are accounted for in in the collaborative case (M_1, M_2, M_3 in Figure 9).

From a financial/investment perspective, as was the case with JV participation, an individual firm will only partake in collaborative action if the expected synergy benefit can outweigh the opportunity cost of participation. Equation [3.6] evaluates the difference in value of the CMO participants' individual investment opportunities (ΔV_{Pi}). Assuming again the profit/shareholder maximisation approach (Bainbridge, 1993), a CI member is expected to pursue collaboration and participate in CMO activity if a value gain is expected,

$$\Delta V_{Pi} = V_{Pi} - V_{Mi}', \qquad [3.6]$$

where, ΔV_{Pi} – Value Change for Individual Participant,

V_{Pi} – Value of Participant in Collaborative Case,

V_{Mi}' - Value of Participant in Isolated Case.

Equation [3.6] determines the impact of CMO activity on an individual firm. Once participants are identified, CMO synergy or the sum of the value of firm-level synergy ($\Delta \sum V_{Pi}$), can be calculated. However, in order to classify a CI member as a participant and avoid the pitfalls of the Impact Problem (Sölvell, 2008), a causal link between CMO services and changes in firm level value drivers has to be established. The identification of participants, sources of synergy and firm-level value drivers is further discussed in Section 3.4 below.

3.4 Participants, Sources of Synergy and Firm-Level Value Drivers

De Graaf & Pienaar (2015) identify the steps taken in the overall process applied for synergy valuation in the M&A setting as a leading practice. This involves consideration in valuation for sufficient planning, taking early action, a focus on post-merger integration and setting a maximum

bid price. By extension, the process by which cluster management activity is carried out is an important consideration for CMO synergy valuation. Considerations of the cluster stage of development, historical, socio-cultural and regional setting, macroeconomic and microeconomic (*Porters Diamond*[2]) environment, existing cluster policies and programmes, and goals and objectives of planned management activity all have impact on the overall process and related value impacts.

Cluster management activity assumes many guises (e.g. policy impact or private IFC) and activities are diverse. Unlike M&A and JV where collaboration is defined by a specific and easily identifiable legal transaction, collaboration in the CMO case exists through delivery and consumption of CMO services and activities. A participant (P_i in Figure 9) is identified as any economic entity that is financially impacted by the CMO. However, due to the wide scope of management operations, determining financial impact is often complicated by the multitude of non-economic factors related to clusters and cluster management operations. Even though all cluster actors ultimately seek growth and development, methods of defining this goal may differ between various stakeholders and for individual CMO activities.

Furthermore, CMO impact on CI members may be of either a direct or indirect nature. Direct participation involves a transaction which can be easily linked to an individual member (e.g. attendance at a seminar, or participation in a market access programme). This kind of interaction is assumed to involve the consumption of a service or activity by a CI member. Indirect participation involves effects that do not result from a transaction specifically involving the CI entity, but arise from business environment improvements made by the CMO (e.g. lobbying government on behalf of industry).

For example, identifying parent benefits in the JV is achieved relatively easily through consideration of the parent's equity stake (or return on investment) in the for-profit JVE. However, the same does not apply in the CMO case. The CMO is considered a NPC that drives value creation directly in CI members and not itself. Resultantly, this framework calculates the impact of CMO services and activities in terms of changes in CI member firm value. This provides a more holistic method of determining impact as it allows for the inclusion of more contextual variables. Firm value is calculated using the multi-period DCF valuation approach as outlined in the literature review. DCF valuation uses three key components to calculate the value of a business entity: Free Cash Flow to Firm (FCFF), Weighted Average Cost of Capital (WACC), and a Terminal Value (TV) which includes a constant growth assumption for perpetuity. Participation is identified through a change in any of these determinants of firm value resulting from sources of synergy attributable to CMO impact.

[2] See also: 2.2.2 Porter's Diamond (pp.17)

The *Impact Problem* (Sölvell, 2008), involves isolating the effect of a planned management activity. In this framework, the impact of the CMO is the "planned program" (Figure 10), which is determined by analysis of the objectives, services and activities delivered by the CMO. The target area is defined as the CI, more specifically the primary participants of the identifying cluster value chain.

Figure 10: The Impact Problem

(Source: Sölvell, 2008, pp. 62)

Sölvell (2008) notes that unplanned consequences (both inside and outside the target area), as well as other sources (or "explanations") may be present when evaluating a planned program. In the CMO case, due to the broad nature of operational objectives and multiple stakeholder groups, these consequences and sources can be assumed to be present. Care should be taken to ensure that unintended impacts, and those originating from external sources, are identified and promptly treated. Impact assessments should be a thorough and continuous process to identify any factors that might impede accurate valuation.

This framework attempts to limit the impact of external sources by focussing on the establishment of direct causal links between CMO services and activities and changes in firm level DCF value drivers. For simplification it is assumed that, for direct participation, causal links are identified in a transaction involving the individual CI participant. Indirect participation is accounted for by means of analysing CMO activity that impacts the cluster business environment in general. In order to identify participants, the activities of the planned CMO program (Figure 10) have to be analysed.

The goals and objectives of the CI drive the specific support services and activities facilitated by the CMO. Identification of CMO impact on CI members, and classification as participants in this framework, is based on the strategic rationale and objectives of management impact. The overarching objectives of CIs, identified by Sölvell, Lindqvist & Ketels (2003, pp.11) and outlined in the literature review, provides a useful starting point for identification of CMO impacts and potential participants.

Different objectives, but more specifically specific services and activities based on these objectives, are all expected to impact participant value in a different manner. For example a principal focus on research is expected to improve innovative capabilities, whereas a principal focus on education and training will result in skills development, and so on. In addition to an overview of strategic goals and objectives of the CMO, budgetary allocations made to specific programmes should be used to identify individual services or activities. Following the identification of individual activities delivered by the CMO, the sources of synergies, both directly and indirectly impacting CI members should be considered.

Traditional business alliance theory (M&A and JV), as discussed in the literature review, generally distinguishes between two main types of synergy – operating and financial (Damodaran, 2005). Operating synergy includes all benefits arising due to operational similarities between collaborating firms and can usually be identified as changes in cash flows resulting from revenue enhancements or efficiencies (DePamphilis, 2011). Operational sources are prevalent in CMO activity due to the similarities between participants related to the identifying value chain and numerous authors have documented the economic benefits of clusters (Marshall, 1890; Porter, 1990, 1998; Krugman, 1991; Malmberg, Sölvell & Zander, 1996; Ketels, 2003; Andersson et al., 2004).

Financial synergies include multiple cash flow and cost of capital effects, generally resulting from the consolidation process involved in M&A. These sources are not as prevalent in CMO activity due to the continuation of corporate identity of cluster participants. However, in terms of DCF any changes to WACC would result in an altered discount rate used in valuation. Resultantly, any CMO impacts that change the debt-equity ratio or cost of debt or equity variables would result in a different value obtained.

Finally, it is highly advised that the knowledge of company managers are used to generate the best assessment of impact on firm values related to CMO sources identified. Damodaran (2005) cites Myers and Majulf (1984) who states that managers possess more knowledge about projects than

investors do. The high level of firm specific knowledge is a valuable source of information regarding the potential impact of sources of synergy on firm-level value drivers

3.5 Conclusion

Chapter 3 develops a synergy valuation framework for the CMO, based on the DCF valuation method commonly applied to other similar business transactions (i.e. M&A and JV). A basic theoretical cluster management synergy valuation framework is presented and participants, sources of synergy and firm level value drives are discussed. In order to present a practical application of this valuation framework, Chapter 4 will cover Methodological considerations for the case study component that follows in Chapter 5.

Chapter 4: Methodology (Case Study)

4.1 Introduction

Case studies are heralded for their ability to address questions that have numerous contextual variables and are considered a highly adaptable research methodology which can incorporate multiple sources of evidence including: artefacts, interviews, observations and documents (Schell, 1992). Woodside (2010, pp.6) states that case study research focuses on describing, understanding, predicting and/or controlling, with the main goal of attaining a "deep understanding" of the specific case at hand. Similarly, Crowe et al. (2011, pp.1) states that case studies can be used to create an "in-depth understanding" of a "complex issue". The case study approach is often associated with answering 'how' and 'why' questions, especially where the researcher has little or no control over the outcome of events (Schell, 1992).

Case studies are defined by Yin (1994) as empirical investigations of a contemporary phenomenon in its real-life context. The particular contemporary phenomenon may involve any current (as opposed to a historic) process, person, organisation, event, or activity. This research method is usually focussed on a bounded system (i.e. within the limitations set by the researcher) with an intensive analysis of the specific setting related to a single case (Bryman & Bell, 2015). The focus on real life context aims to incorporate all contextual factors that may influence the phenomenon in question.

The synergy valuation framework presented in Chapter 3 is synthesised from CI literature (e.g. Porter & Emmons, 2003; Sölvell, Lindqvist & Ketels, 2003; Ketels, Lindqvist & Sölvell, 2006; Teigland & Lindqvist, 2007; Soviar, 2009; Lämmer-Gamp, zu Kôcker & Christensen, 2011; Müller et al., 2012; Melax, 2013) and business alliance literature (e.g. Roberts, Wallace & Moles, 2003; Damodaran, 2005; Damodaran, 2006; DePamphilis, 2011; Neuhaus & Beer, 2013; Van Dijk, 2012; De Graaf & Pienaar, 2013). The case study component of this dissertation aims to illustrate practical application of the valuation process by looking at a simplified single case. As such, the goal is to investigate the value potential of a real-world CMO by looking at the case of the SAFI and its expected impact on XYZ Company. Given the immense scope of a full-scale valuation and lack of empirical data related to SAFI's actual impact on members, this case study does not determine the actual value of SAFI. The aim is to inform the development of a more holistic framework for valuation. A secondary goal is to serve as an illustrative case for any reproductions by industry on a larger scale.

This case study was conducted with the aim of informing the (purely theoretical) framework developed in Chapter 3 to account for functional dissimilarities between real-world and theoretical

scenarios. The complex and dissimilar nature of individual CMO's, in terms of varying objectives and activities observed in practice, necessitates a need to develop an in-depth understanding of each specific case before synergy valuation commences. For each individual CMO, determining synergy value involves two main questions: (1) how does the CMO impact cluster participants, and (2) what is the firm specific value of synergy attributable to CMO activity?

The first question investigates the impact of the CMO on member firms, the sources of synergy. The specific services and activities hosted by the CMO and consumed by participants have to be analysed. The second question involves determining the financial impact, in terms of changed cash flows, of synergy sources of firm level value drivers. Finally calculating the difference in the sum of the value between the collaborative and non-collaborative scenarios yields the value of synergy attributable to the CMO.

4.2 Case Studies in Finance

The case study research approach is most commonly associated with social sciences (Crowe et al., 2011), but is extensively used in multiple disciplines including: political science, public administration, planning studies, psychology and sociology (Gilson, 2012). Financial research has historically been dominated by quantitative methods, but the use of the case study approach is on the rise (UK Essays, 2013). Similarly, Bryman & Bell (2015), citing Eisenhardt & Graebner (2007), notes that that case study research is becoming an ever more popular and widely adopted research design in the business and management spheres.

According to Bengtsson & Larsson (2012) the case study methodology is historically not as frequently used in financial research as nomothetic approaches (i.e. quantitative focus on limited variables in large samples). These authors note that, in terms of journal publication, case study approaches tend to have a relatively lower submission rate and a higher rejection rate when compared to other research approaches. This leads many researchers to disregard the case study approach for fear of rejection by publishers (Bengtsson & Larsson, 2012).

However, Schell (1992) pronounces that management and organisational studies can draw great benefit from case study research approaches. The author notes that this methodology provides an unparalleled method of analysis for complex research questions, taking into account the potential impact of numerous contextual variables that may be excluded in simplified experimental models. Similarly, in their critical review of existing merger and acquisition (M&A) case study literature,

Bengtsson & Larsson (2012) found that case studies contribute to the rich and dynamic understanding of complex and contextually rich M&A phenomena, pointing out specifically the strength of longitudinal approaches in this research design.

4.3 Suitability of the Case Study Method

Case studies may involve a single case or multiple cases (Schell, 1992). Multiple cases are useful for comparisons between different scenarios and are often used to access replication of a specific incident. Single cases are analogous to single experiments and have three predominant rationales: (1) it can be applied to analysis of a well-formulated theory (a critical case); (2) single case studies can be used for analysis of a unique scenario that is to be documented; (3) revelatory case studies seek to shed light on new phenomena (Schell, 1992). The case study presented in this dissertation constitutes a revelatory single case. It seeks to illustrate practical application of the valuation framework developed in Chapter 3 and aims to "shed light" on the practicalities of a valuation practice that has not yet been illustrated in the cluster management sphere.

Additionally, Schell (1992, pp.6) states that case studies are suitable for exploratory, descriptive and explanatory research designs. Case studies are most commonly exploratory in nature – i.e. set up to explore a phenomenon. This logic derives from the fact that one cannot set up a survey or experiment for a phenomenon that is as yet uncertain (unexplored). Schell (1992) notes that some authors (e.g. Miles, 1979) maintain that case studies are limited to exploratory research; whereas other authors (e.g. Yin, 1981) claim that case study use is only limited by the lack of understanding of their application in other research designs.

Woodside (2010, pp.11) defines potential objectives of a case study research design as "description, explanation, prediction and control". In this view *descriptive studies* as those that seek to answer who, what, where, when and how questions. *Explanatory studies* as those that seek to answer the 'why' question. *Prediction* involves forecasting short- and long-term states, events, or behaviours. Finally, *control* involves impacting participants to change perceptions, attitudes and behaviours. Gilson (2012) notes that exploratory and descriptive case study approaches may be utilised as theory development, but that explanatory studies should utilise existing theory as a design parameter. The case study presented in this dissertation contains both exploratory and descriptive elements. It seeks to explore the impact of SAFI, by asking how the CMO impacts participants. This is required due to the dissimilar nature of individual CMO's. Furthermore, once impacts are determined,

application of the synergy valuation framework to the SAFI case aims to describe the financial impact of the CMO by determining the value of synergy attributable to its actions.

Woodside (2010), citing Senge & Huff (1990), notes the importance of understanding the 'mental models' used by participants in a specific case. This mental model encompasses the typical steps involved in the process under examination including: investigation into the accepted process, the actual process followed, participant perceptions of the process, and perceptions of the role of other participants in that process. This is especially relevant in the cluster setting due to the wide scope of potential impacts and the lingering definitional obscurity of the greater cluster concept. There are numerous factors that make up the clustering process. This includes the strength of the natural agglomeration phenomenon, promotion via public and/or private sources, as well as a multitude of varying objectives and goals of various actors involved. Determining the specific mental model used by SAFI is a crucial step in determining the value impact it has on participants. This mental model includes aspects such as financing, decision making, services and activities rendered, etc.

Furthermore, regarding the mental model and clarification of cluster definitions, it should be noted that this dissertation focuses on the CMO as vehicle for cluster development and promotion. It considers the process of collaboration between actors in a cluster region which is managed by a CMO. The aim is to determine the value of management and non-CMO activities often included in the cluster sphere (e.g. government policy plans and programs) are not specifically addressed in full detail. The CMO entity is assumed to be a non-profit organisation which seeks to maximise value within the CI. Resultantly, the value of the CMO can then be inferred by determining the value of all participants under two operating scenarios; one including the impact of CMO activity, the other excluding CMO impact.

4.4 Criticisms of Case Study Research Approach

Case studies may use qualitative and quantitative data sources, however epistemological criticisms of the case study (and in-fact of most qualitative research) relate to the fundamental philosophical basis of the research approach (Schell, 1992). Bengtsson & Larsson (2012, pp.4) mention that the nomothetic research approach uses large samples to make statistical generalisations, whereas idiographic research attempts to provide "rich descriptions and/or theoretical generalisations". In their view, the idiographic approach is acclaimed for its ability to create new insights and for its role in development of new theories.

Quantitative research assumes a nomothetic approach and maintains the paradigm that the reality of a situation can be defined and understood from an objectivist stand-point (as the case in natural sciences) (Schell, 1992). Alternatively, qualitative research maintains that reality can be defined subjectively as "a projection of imagination" that can be analysed through "phenomenological insight and subjective processes" (Schell, 1992, pp.9). This qualitative methodology often constitutes an idiographic approach. According to Schell (1992), these different philosophical views on reality form the extremes of an epistemological spectrum and are fundamentally irreconcilable - neither can be judged superior to the other. Case study justification ultimately relies on the strength of the methodological approach applied, as well as design, execution, analysis and evaluation of the specific case at hand (Schell, 1992).

The case presented in this dissertation assumes a mixed-methods approach to data collection and includes quantitative and qualitative elements. The value of synergy is calculated quantitatively based on the information contained in the financial statements of the participating member companies. The impact of the CMO on members has to be inferred based on the specific services and activities hosted by the CMO. In order to determine this impact, qualitative data regarding the perceived impact of the CMO has to be collected from participants. This qualitative information is then used to infer financial performance under the proposed valuation scenario in which synergy is calculated.

A major practical criticism of the case study approach is misuse of specific types of case study. Schell (1992) provides a two-by-two matrix of case study design based on number data sources and number of individual cases studied (Table 1). The clarification provided in Table 1 aids in preventing selection of the wrong approach given the research question at hand.

Table 1: Basic Types of Design for Case Studies

(*Source: Schell, 1992, pp. 6*)

	Single Case Designs	Multiple Case Designs
Holistic (Single unit of analysis)	Type 1	Type 3
Embedded (Multiple units of analysis)	Type 2	Type 4

The case study presented in this dissertation constitutes a Type 1 design structure. It makes use of a single case design (SAFI) and uses a single unit of analysis (synergy value) which is calculated by means of the DCF valuation approach.

In addition to epistemological and type criticisms, case studies include practical (or methodological) considerations. Practically, case studies are considered time consuming, labour intensive, more prone to researcher's bias, and require a higher level of researcher skill and expertise when compared to other research approaches (Schell, 1992). Similarly, Crowe et al. (2011) notes the large volume of data and time restrictions that often limit the quality of case study analysis. Given the scope of this dissertation as a Master's dissertation focussed on synthesising a framework for valuation, time constraints apply to the case study component. CI's are often large organisations with numerous members. Due to time limitations, and given its use for illustrative purposes of practical application, this case study only determines the value impact of the CMO on a small sample of SAFI's participants.

Furthermore, critics have also pointed out that case studies provide little merit for scientific generalisation, especially in the single case scenario (Schell, 1992; Crowe et al., 2011). However, Gilson (2012), citing Stanton & Salazar (2004), notes that single cases may provide valuable insights when used for testing theory. Potential remedies for lack of generalisation in case study research includes the use of theoretical sampling (i.e. use of a specific conceptual framework) and providing transparency through detailing the steps in the research process - i.e. sampling process, data collection, and researchers involvement (Crowe et al., 2011). This rigour in case study applications is also mentioned by Gilson (2012) as crucial for knowledge creation and assessments of credibility. Additionally, certain ethical issues (e.g. bias) may also be present if the researcher has a functional connection to the subject (i.e. researcher also a team member). Woodside (2010) mentions failures of the researcher to report specific observations and failures to collect the necessary information as key criticisms of the case study approach.

In terms of the case study presented in this dissertation, the steps taken in the research process are outlined as recommended by Crowe et al. (2011) and Gilson (2012). Furthermore, this case study is included in order to limit researcher bias that may be present if the valuation framework is illustrated by means of an artificially created example. Additionally it serves as empirical grounds to substantiate application of the valuation process in a real-world scenario. It should also be noted that this researcher is acting independently and has no functional connection to the case subject. With regards to failures in reporting observations and collection of information, care has been taken to include all value related impacts of the CMO in question.

Another frequent criticism of the case study approach is reliability and validity of the research method. However, according to Schell (1992), the negative impact of these factors can be limited through incorporation into research design. Construct validity is crucial for eliminating subjectivity in research design and is enhanced through the use of multiple data sources and clear chains of evidence (Schell, 1992). Internal validity is important for questions of causality and involves testing the validity of inferences made in data analysis and external validity involves the generalisation ability of case study findings and is considered weak in case study approaches (Schell, 1992). Reliability involves documentation of the research process to ensure use of the same approach in repetitions of the research process (Schell, 1992). Construct validity, in this dissertation, is incorporated in to the framework development section (mental model) used in the case study. Internal validity is determined through the interview process where participating firm managers are asked to comment on the impact of CMO activity on their own business. The aim is for the analyst to make as few assumptions about causality as possible and rather have this informed by participants.

4.5 Benefits of Case Study Methodology

Bengtsson & Larsson (2012) conduct an extensive review of management case study literature and identify a number of strengths of this research approach in the management field. These authors found that case studies are useful for new theory development and analysis of contemporary phenomena, as well as an ability to provide a "fresh perspective" for existing phenomena. The belief is that case study research is particularly useful in new theory development and for attaining a fresh perspective on existing topics (Eisenhardt, 1989). According to Eisenhardt (1989) the strengths of case study driven theory development include elements of novelty, testability, and empirical validity due to its correlation with empirical evidence. Bengtsson & Larsson (2012) also acclaim the longitudinal strength of case studies in describing organisational processes over time. By revisiting the case over multiple time-periods a greater understanding of the evolution over time can be built.

4.6 Conclusion

It was found that this research approach provides a valuable means of exploring and describing the CMO synergy valuation framework developed in Chapter 3. Chapter 4 covers methodological considerations for case study research in finance. It was discovered that even though highly customisable and often well suited to cluster research, the case study approach is not often

observed in the financial literature. In addition to epistemological and type criticisms, case studies include practical (or methodological) considerations. The case presented in Chapter 5 uses a mixed methods approach and seeks to illustrate the practical application of the framework developed in Chapter 3.

Chapter 5: Case Study (The South African Furniture Initiative, SAFI)

5.1 Introduction

This case study is bound within the South African furniture manufacturing industry, specifically looking at the SAFI legal entity. It is conducted with the aim of developing a more holistic synergy valuation framework by incorporating both theoretical and practical viewpoints. Given the ambiguous nature of the cluster phenomenon, it was considered useful to analyse an existing CMO in order to gain a better understanding of CMO impacts. Policy and research documents, as well as financial statements and informal interviews with private sector participants (furniture manufacturers) and the interim cluster manager were used to investigate the case for the valuation of CMO synergy.

In addition to being utilised informatively as part of the framework development process, the case study constitutes a practical attempt at applying the framework for synergy valuation presented in Chapter 3. Section 5.2 comprises an economic and industrial analysis which evaluates the South African general economic conditions and furniture industries. This is followed by an investigation of SAFI, in terms of its history, legal structure and operational mandate in Section 5.3. The sources of management synergy related to SAFI operations are identified and analysed in Section 5.4. The illustrative example of ex-ante valuation for XYZ Company is covered in Section 5.5.

5.2 Economic and Industrial Analysis

This step in CMO synergy valuation involves an analysis of general economic conditions in South Africa (5.2.1), an evaluation of the global and local furniture industries (5.2.2), as well as an investigation of public policies and support programs pertaining to the local furniture manufacturing industry (5.2.3). Looking at historic performance and current events informs the contextual factors and current setting of the SAFI case. This economic and industrial analysis is used in the process of estimating expected future conditions over the forecast period (2016 – 2018) and serves to inform financial modelling for collaborative and non-collaborative performance scenarios.

5.2.1 South African General Economic Conditions

South Africa's gross domestic product (GDP) is estimated at $US 350 billion growing at around 2% per year (World Bank, 2015). Lower commodity prices and the Chinese economic slowdown are mentioned as contributing factors to this relatively low growth outlook (World Bank, 2015). According to Statistics South Africa (StatsSA), from 2004 – 2007 the country maintained a 5% GDP growth, but after the global financial crisis in 2008 only 2% was manageable (StatsSA, 2015). Year-on-year GDP in September 2015 was recorded at 1.1% (TradingEconomics, 2015).

TradingEconomics.com (2015) reports that inflation, after spiking to nearly 12% in 2008, decreased to 4.3% in 2010. Price increases have been steadily on the rise since 2008 and inflation peaked at 6.4% in 2014. Consequently, the reserve bank hiked the repo rate to 6.25% in November 2015 to keep inflation to its 3%-6% target band. Year-on-year inflation was 4.8% in November 2015. The Rand exchange rate has deteriorated against most major currencies in the past five years and drastically so in 2015. The R/US$ exchange rate was R7.26 in 2011, R10.85 in 2014, and R15.02 at the time of writing (December 2015).

South Africa is renowned for its peaceful transition to democracy in 1994 (MediaClub, 2015). The post-1994 ruling party adopted a pro-poor public spending approach with the aim of improving social development and achieving transformation in the post-apartheid economic environment (WorldBank, 2015). The National Development Plan for 2030 (NDP, 2016) outlines the government's two primary strategic goals as reducing the income gap and poverty. Total government spending is estimated at 39% of GDP in December 2015 (TradingEconomics, 2015). Public social development projects account for 3.5% of GDP spending, which is double the average in developing countries (WorldBank, 2015). However, South Africa still has substantial income disparity with the bottom half of income earners accounting for less than 8% of the gross national income (WorldBank, 2015). Government is under increasing pressure from opposition parties to create jobs, advance income equality and speed up the transformation process. However, the official unemployment rate is hovering around 25% (TradingEconomics, 2015).

In a November 2015 economic forecast, the Organisation for Economic Cooperation and Development (OECD, 2015) estimates uncertain times ahead for the South African economy in the next two years up to the end of 2017. Government spending is limited as public debt levels have to be curbed. Inflation is currently fuelled by the weakening rand and high food and energy (specifically electricity) prices. Furthermore, new electricity supply is only expected to be finalised in 2017 which has negative consequences for industry (OECD, 2015). However, even though poor currency

performance is traditionally a signal of an economy under pressure; the weaker Rand may provide a competitive edge for local manufacturers in foreign markets.

The Global Competitiveness Report for 2014 /15 (GCR14/15), published by the World Economic Forum (WEF, 2014), ranked South Africa 56th out of 144 participants. The annual study evaluates the countries based on numerous competitiveness factors including: institutions, policies and other factors that impact productivity. South Africa is ranked 89th in *Basic Requirements* (including: infrastructure, institutions, macroeconomic environment, health and primary education); 43rd in *Efficiency Enhancers* (including: education and training, goods market efficiency, labour market efficiency, financial market development, technological readiness, market size); and 37th for *Innovation and Sophistication* (including: business sophistication, innovation).

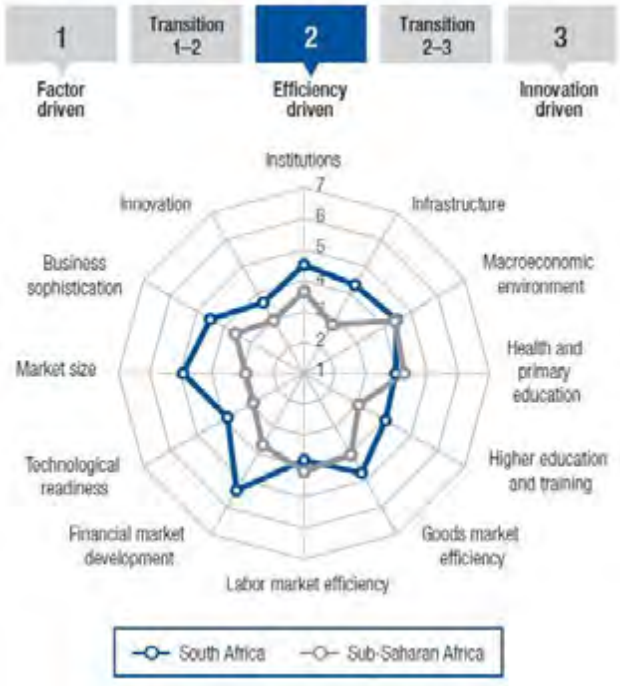

Figure 11: South Africa & Sub-Saharan Africa Stage of Development

(Source: WEF, 2014, Global Competitiveness Report, pp340.)

In terms of stage of economic development, South Africa (SA) is identified as an efficiency driven economy (Figure 11). This graphic also includes the average performance of Sub-Saharan Africa for all major indices used in the GCR14/15. From this it is evident that South Africa outperforms regional competitors in most indicators except *Health and Primary Education* and *Labour Market Efficiency,*

where SA is below average, as well as *Macroeconomic Environment,* where SA is on par with Sub-Saharan Africa.

Analysis of the GCR14/15 yielded a number of interesting observations regarding the South African economy. Financial markets are regarded as some of the best globally. Both the *regulations of securities exchange* and *strength of auditing and reporting standards* indices are rated the best in the world (1st/144). Other well performing factors include efficiency of corporate boards, protection of minority shareholders' interests, financing through local equity market, and availability of financial services. On the down side South Africa performed poorly in terms of the impact of crime on business, cooperation in labour-employer relations, and hiring and firing practices (WEF, 2014).

In terms of economic structure, South Africa has historically been predominantly based in primary sector activities such as mining and farming (MediaClub, 2015). However, in the past few decades the economy has undergone a structural transformation (StatsSA, 2015) with secondary and service sectors now playing a far more prominent role in the country's economic makeup.

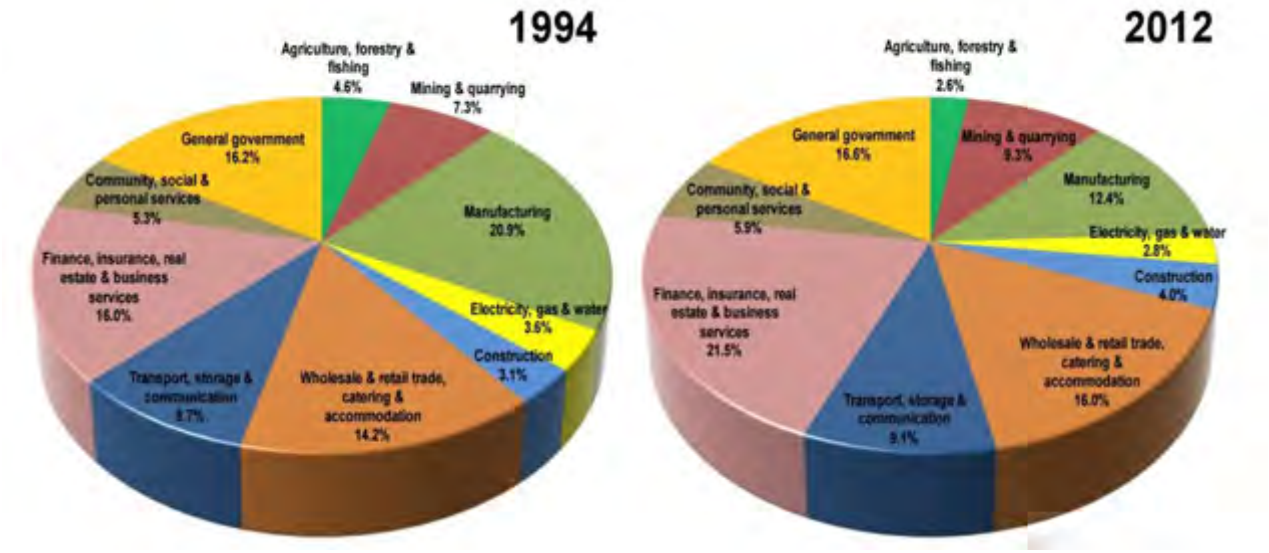

Figure 12: Key Sector GDP Contributions for 2013

(Source: IDC, 2013 - South African Economy: an Overview of Key Trends Since 1994, pp4.)

Figure 12, taken from an Industrial Development Corporation (IDC) 2013 economic review, provides an overview of sector contributions to GDP between 1994 and 2012. Statistics South Africa (StatsSA, 2015) specifically notes the increase of importance of the finance, real estate and business services sectors. Financial services (21.5%) are the largest contributor to GDP in 2012, followed by

government (16.6%), and wholesale & retail (16.0%). Manufacturing is the fourth largest sector and accounted for 15.2% of GDP in 2012, down from largest contributor (20.9%) in 1994.

The South African manufacturing sector is historically diverse and includes well-established mining, metal, agricultural and agro-processing, textile, leather and footwear, automotive, chemical, financial services and IT value chains. According to the official Industrial Action Policy Plan 2013/14 - 2015/16 document (IPAP, 2016), the South African furniture industry sub-sector is reported to contribute 0.95% to manufacturing GDP and 1.6% to manufacturing employment.

5.2.2 Furniture Value Chain

Globally, furniture manufacturing has been traditionally considered a low-tech and labour intensive industry. However, a Department of Trade and Industry (DTI) report on Factors Impacting the Competitiveness of Key Export Value Chains in the Furniture Sector (Morris & Jackson, 2002) cites a number of factors that has lead the furniture sector to become increasingly competitive including: low barriers to entry, multiple new market entrants, greater efficiencies, and decreasing costs.

The Draft Strategy for the Development of the Furniture Industry, issued by the DTI in November 2008 notes that the global furniture industry grew by 13% from 2002 to 2006 (DTI, 2008). China had been identified as the largest exporter of furniture products in 2006, with 20% of the global market. Furthermore, Europe was the largest global importer and by 2006 the USA had become a significant global importer of furniture products. In 2006, Sub-Saharan Africa was reported to account for less than 1% of global demand with South Africa maintaining 97% of that market.

In a 2014 furniture sector research report, the Western Cape Destination Marketing Investment and Trade Promotion Agency (WESGRO) reported that the global furniture market is worth $US 463 billion. Figure 13 depicts the value of global furniture trade for the period 2004 to 2012. Global trade displayed strong growth up until the 2008 financial crisis. In 2009 the furniture sector saw a slump, but has displayed an upwards trend from 2010 to 2014. The WESGRO (2014) report also notes that global furniture trade has increased more than furniture production over the past 10 years.

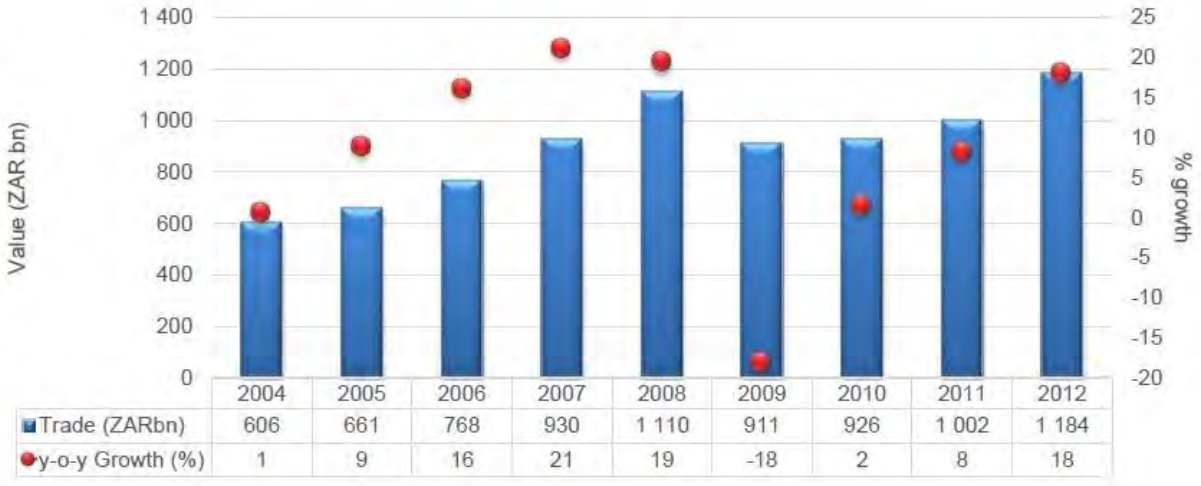

Figure 13: Global Furniture Trade 2004 – 2012

(Source: WESGRO Furniture Sector Fact Sheet, 2014, pp.8)

Morris & Jackson (2002) provide a detailed overview of the performance of the South African wood and furniture sectors for the period 1993 to 2001. From this research it is evident that the South African furniture and woodworking industries were in decline during the late 1990's and early 2000's, as the South African furniture sector displayed decreasing efficiency and downgrading in terms of value, business formation and employment levels.

Capital expenditure in the furniture sector during the second half of the 1990's decreased even though total manufacturing investment (average of all other sub-sectors) increased during the period. Labour productivity in the furniture sector during this period was also uninspiring with 2001 labour productivity levels much lower than those observed in 1993 (Morris & Jackson, 2002). Sales of wooden furniture products in the South African furniture industry steadily increased up until 1997, but started declining towards the end of the decade (Morris & Jackson, 2002). Production grew at an average of 5% during the period from 1993 - 2001, but showed a negative growth trend of -3% during the final four years of the decade.

Morris & Jackson (2002), citing Dunne (1999), note that the South African Furniture Traders Association reported a decrease from 900 members in 1970 to only 188 members in 1999. The average number of employees per firm also decreased from 33 per employer to 13 per employer during this time period. Interestingly, Dunne (1999), according to Morris & Jackson (2002), observed that export orientated firms had an average of 266 employees, a number far greater than that of locally oriented firms. The furniture sector employed over 48 000 people in 1996, but this fell to

below 45 000 by 2001 Morris & Jackson (2002). Furthermore, Morris & Jackson (2002) reported that wage growth was static and there was 0% production expansion from 1995 until 2001.

In 2015, the South African furniture manufacturing industry employed 29 000 people in 2200 registered companies (IPAP, 2016). If it is assumed that these employment figures and those presented by Morris & Jackson (2002) were obtained through the same method (i.e. inclusion of same furniture sub-sectors) this would indicate a sharp (35%) decline in furniture sector employment between 2001 and 2016.

Additionally, skills development was minimal and demand for skilled labour in the furniture industry was ranked among the lowest across all 46 main national industries. With regards to regional distribution Gauteng Province accounts for 37% of total furniture production, KwaZulu-Natal for 23%, and the Western-Cape 19% (DTI, 2008). The exact size of the informal sector is unknown; however it is believed to be substantial resource that shows promise for development and integration.

The South African furniture sector became more export orientated during the 1990's. Furniture exports increased substantially from around a R100 million in 1993 to just over R700 million in 2001 (constant 2000 prices). However, the Draft Strategy for the Development of the Furniture Industry (DTI, 2008) noted that the South African furniture industry has gradually trailed behind global competitors. Increases in cheap Asian furniture products on the global market, reduced investment and development funding, declining skills and innovation, low levels of research and development, and weak local competition was all cited as key competitiveness factors that were decreasing global market share. Furthermore, South Africa has become a net importer of furniture products (DTI, 2008), a reversal from the net-export position maintained in the early 1990's. Figure 14 depicts South African furniture trade for the period 2004 to 2013.

In 2013, Germany was South Africa's largest furniture export partner (R1.15 billion), with Namibia (R557 million) and Botswana (R427 million) second and third respectively. WESGRO (2014) notes that seven of the top 10 South African furniture export destinations are other African countries. The Fibre Processing & Manufacturing Sector Education and Training Authority report on the furniture sub-sector (F&PMSETA, 2014) identifies higher electricity, housing and food prices are decreasing disposable income which puts local markets for consumer goods under stress. WESGRO (2014) estimates growth for the furniture sector at around 6% for the period 2012 to 2018.

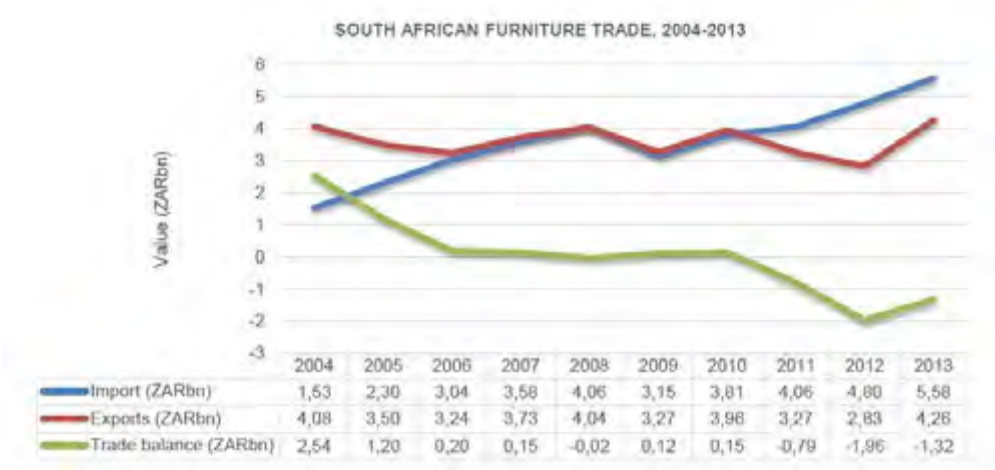

Figure 14: South African Furniture Trade 2004 – 2013

(Source: WESGRO, 2014, pp. 11.)

According to Morris & Jackson (2002), the competitiveness of South African furniture suppliers during the 1990's was hinged primarily on price efficiencies. Figure 15 outlines strategic competitiveness factors of South African furniture suppliers in comparison to the requirements, as viewed by European markets. In addition to the weaknesses evident in Figure 15 (i.e. quality, reliability, etc.) design capability and lack of skills were identified as severe limiting factors to the strength of the South African furniture sector.

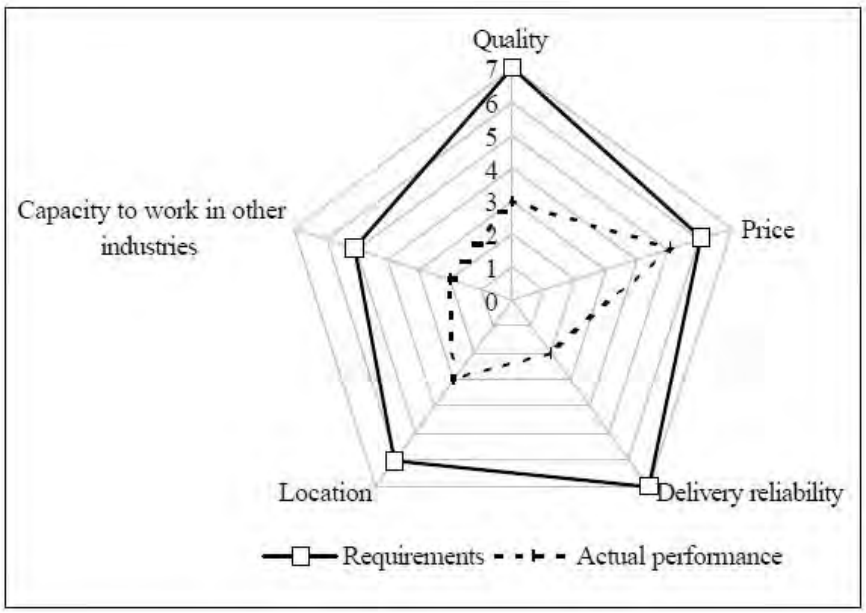

Figure 15: European Buyers Perspective on South African Furniture Suppliers

(Source: Morris & Jackson, 2002, pp.40)

Given the decline in local performance and increase in global competitiveness witnessed in the South African furniture sector since the mid 1990's, combined with the governments focus on employment creation and poverty reduction as per the National Development Plan for 2030, the furniture sector has been identified as a strategic industry that is in need of governmental support. The following section analyses public sector policies and support programs targeted at the furniture manufacturing sector.

5.2.3 Existing Public Sector Cluster and/or Development Policies

The 2008 Draft Strategy for the Development of the Furniture Industry (DTI, 2008) was produced in terms of the National Industrial Policy Framework (published in August 2007) which forms part of the governments National Development Plan for 2030 (NDP, 2016). This draft strategy report (DTI, 2008) acknowledged the importance of the South African furniture manufacturing sector in terms of employment creation and contribution to GDP.

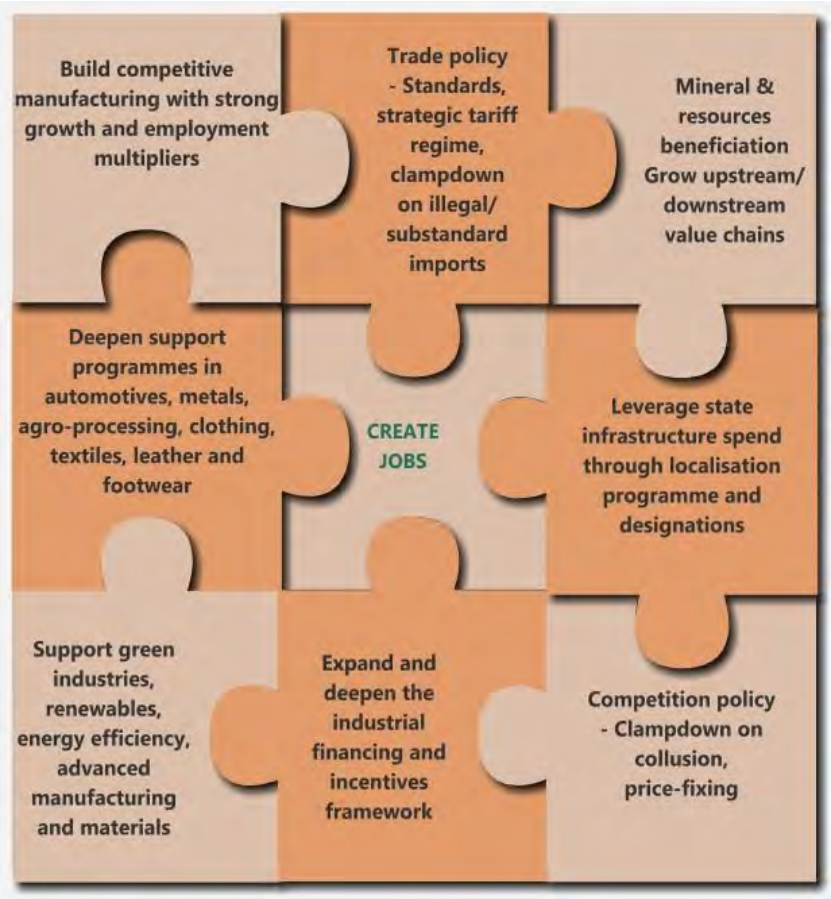

Figure 16: Summary of IPAP Objectives

(Source: DTI Industrial Action Policy Plan 2013/14 – 2015/16, pp.10.)

IPAP (2016) identifies the greater South African manufacturing sector as well diversified and with the potential to compete globally. Manufacturing is seen as a key contributor to GDP and employment. The vision of the IPAP aims to grow and develop the manufacturing sector through improvements in competitiveness and cooperation between all major role players (private sector, public sector, labour, and international partners). The objectives of the IPAP are in line with those of the NDP and are primarily focussed on poverty reduction and income equality (employment) are summarised in Figure 16.

In 2002 the Department of Trade and Industry's (DIT) Policy Support Programme Report on the Furniture Sector (Morris & Jackson, 2002) identified a number of key issues in the furniture manufacturing sector that necessitates public sector involvement. The steady decline of the furniture sector during the late 1990's with the associated impact this had on employment and GDP, the structural shift in global markets, and the heavy reliance of the local industry on the UK and Western European export markets were cited as key reasons for public intervention.

The 2008 Draft Strategy for the Development of the Furniture Industry (DTI, 2008) recognised numerous industry challenges, including declining competitiveness and limited access to new markets. The primary focus of public intervention is on increasing capital investment, product upgrading and developing new export markets. The report indicates the intention of positioning the South African furniture industry as a "producer of high value niche furniture products that are globally competitive based on quality and/or differentiated designs" (DTI, 2008, pp. 2).

The objectives of the 2008 Draft Strategy was to develop key action plans to advance skills training, industry competitiveness and SMME development, with the aim of increasing employment and export competitiveness. The policy action plans outlined in the 2008 Draft Strategy (DTI, 2008) included five main programs. The SMME development programme (1) is aimed at promoting and development of SMME competitiveness. The raw material programme (2) is aimed at improving access to raw materials, specifically for SMME's. The furniture centre of excellence program (3) was initiated in response to declining exports, predominantly resulting as an effect of decreased research, innovation and design capabilities in South Africa compared to other furniture export countries. Furthermore, the furniture skills development (4) and the manufacturing excellence programs (5) were initiated to advance labour skills and production ability, efficiency and productivity.

According to the F&PMSETA furniture sub-sector report (2014), IDC increased funding for all four targeted high-growth manufacturing sectors, including the furniture industry. This report also

mentions that government has utilised public procurement plans to smooth market demand for locally produced goods, as well as geared the economy for more employment intensive and value adding services. Furthermore, more stringent credit regulations have decreased local demand, but also significantly improved credit default rates (F&PMSETA, 2014).

In light of challenges faced and availability of public sector support for the South African furniture manufacturing industry, the process of developing the SAFI was initialised in 2014. The following section takes a closer look at SAFI and its evolution from a previously provincial CI in the Western Cape region.

5.3 CMO Analysis, South African Furniture Initiative (SAFI)

This section analyses the history and evolution of the SAFI from the Western Cape Furniture Initiative (WCFI). SAFI's vision, mission, objectives, mandate and specific support/operational activities are evaluated in order to determine the expected impact, in terms of synergy value, on the furniture manufacturing sub-sector.

5.3.1 Evolution from WCFI

The Western Cape Furniture Initiative (WCFI) was officially established in February 2009 as a non-profit company (WCFI-AR, 2013). This cluster management program was a joint initiative by industry and provincial government aimed at developing the Western Cape furniture industry into a sustainable and globally competitive sector (WCFI-AR, 2013). The original trigger for cluster management activity came from provincial government and, after numerous attempts at initialisation, enough support was eventually roused by the end of 2008 (Melax, 2013).

According to a case study performed by Melax (2013), WCFI had 74 registered members. These included a diverse range of furniture value chain actors ranging from design and manufacture, to professional associations and training institutions. Furthermore, Melax (2013) notes that the WCFI management organisation had two permanent staff members and the board of directors consisted of industry actors (manufacturers and designers), local government representatives, the furniture bargaining council, labour representatives, and skills, education and training authorities.

From 2009 – 2014, WCFI maintained three overarching programmes, outlined in the WCFI annual report for 2012/2013 (WCFI-AR, 2013). These programmes were aimed at promoting the provincial

furniture industry: (1) The Business Development Programme was aimed at developing human resources, delivering manufacturing support and developing business management skills. For example, the PUM project involved retired senior executives from the Netherlands to assist local manufacturers with strategic and operational issues. (2) The Market Access Development Programme was targeted at improving local and international market penetration and brand image. This included, amongst others, a trade show mission to Sweden, a market access mission to Ghana, and a design competition to generate exposure and promote local firms. Finally, (3) the Industry Development Programme involved three main objectives. (i) Improvement of administration, financial management, HR, corporate governance and compliance with legislation. (ii) Communications and Sector Promotions objectives included frequent newsletters, maintenance of a website and development of an industry database. (iii) Networking and Partnering objectives involved workshops, seminars and facilitation of meetings between various role players.

Funding for WCFI was primarily secured from the Western Cape Provincial Government, through the Department of Economic Development and Trade (DEDAT), under the Western Cape Cluster Program (also known as the special purpose vehicle, or SPV, program). Membership fees were charged based on number of employees per member. Additionally, Melax (2013) found that the Furniture Bargaining Council of the Western Cape also contributed to WCFI operations by providing non-financial support (office space, telephone, internet and insurance). Official funding obtained from DEDAT decreased annually and eventually ceased in 2013. WCFI ceased operations in August 2014.

According to current interim CEO of SAFI and former CEO of the WCFI, Mrs Bernadette Isaacs, the opportunity for a national CI in the furniture sector was considered after the dissolution of WCFI in August 2014. As interim CEO of SAFI, Mrs Isaacs played a pivotal role in the SAFI establishment process which involved the development of a SAFI mandate, determining an appropriate funding structure, and determining operational (support) requirements and promotional activities. SAFI includes all three of the main furniture manufacturing clusters in South Africa (i.e. Gauteng, KwaZulu-Natal, and Western-Cape).

Development of SAFI involved the input of numerous role players including industry (primary and supporting actors), the public sector, labour representatives, and academia and training institutions (SAFI, 2015c). The process of developing a business plan, based on the requirements set by industry and various other role players, lasted from August 2014 to December 2015 (Isaacs, 2015). In this interim period a number of administrative and informational projects were conducted and SAFI will start full scale support activities in 2016.

5.3.2 SAFI - Vision, Mission, Challenges Faced, and Operational Mandate

The SAFI is a joint initiative of industry, labour and government. The SAFI CMO is incorporated as a non-profit organisation involving various furniture sector actors with the common interest of promoting growth and development of the South African furniture industry (SAFI, 2015c). The organisations vision, mission, and objectives as per the SAFI Annual Report 2015 (SAFI, 2015c, pp.4) are as follows:

> *"The SAFI vision is to drive the South African furniture industry to become locally and internationally recognised for advanced design and manufacturing capabilities. The mission is to drive productivity growth, employment, and positive transformation in the furniture value chain."*
>
> *"SAFI objectives include providing market and industry information, facilitation of support services, positioning the furniture industry to penetrate international and domestic markets, facilitate supply chain optimisation, and promote effective design and manufacturing."*

Current challenges faced by the South African Furniture Manufacturing Sector which are outlined in the SAFI business plan include the following three main factors (SAFI, 2015a). (1) Decreasing competitiveness due to low technological innovation, skills shortages, and increased competitiveness form Asian markets. (2) Manufacturers' access to the retail market is still hampered by strong retailer bargaining power in South Africa. (3) Other domestic industry constraints include limited design capacity, low efficiencies, weak technical skills base, and rising input costs.

Given these challenges facing the South African furniture manufacturing industry, the mandate of SAFI covers seven main areas addressing the current challenges in the furniture manufacturing sector as follows (excerpt from: *SAFI Inaugural 3 Year Business Plan: 1st July 2015 to 30 June 2018*, pp.5):

- *Provide market intelligence information.*
- *Facilitate training, mentoring and other support services.*
- *Promote the South African furniture manufacturing industry and associated furniture design.*
- *Facilitate access to domestic and international markets, especially for small, and previously disadvantaged individual (PDI) owned enterprises.*

- *Determine and facilitate the implementation of initiatives and programmes to enhance the performance of the South African furniture industry.*
- *Sustain existing employment and create new employment opportunities within the furniture industry's value chain.*
- *Facilitate the development of strategic relationships throughout the furniture value chain.*

5.3.3 SAFI Executive Structure

The SAFI Memorandum of Incorporation (SAFI, 2015b) outlines the executive structure of the CMO. SAFI is a non-profit organisation (NPO) as per Section 19(1) of the Companies Act. The entity is governed by a National Executive Committee (SAFI NEC) of 15 members. Board members are nominated by employers' organisations (nine members), trade unions (four members), retail sector (one member), and supplier sector (one member). Member selection should reflect the three main hubs in South Africa (Gauteng, KwaZulu-Natal, and Western Cape) as far as possible.

The SAFI NEC has no jurisdiction over any existing regional bodies. Four Technical Steering Committees (SAFI TSCs), which are appointed by the SAFI NEC, are responsible the various promotional avenues pursued by SAFI (see: strategic pillars – Figure 17). The NEC, with support from the TSC's, drives the information collation and policy activity due to its diverse and all-encompassing nature (SAFI, 2015b).

According to the SAFI Inaugural 3 Year Business Plan, the SAFI NEC will be responsible for the following (excerpt from: *SAFI Inaugural 3 Year Business Plan: 1st July 2015 to 30 June 2018*, pp.12):

- *Governance and compliance of the SAFI non-profit company.*
- *Development and deployment of strategy to support the attainment of the SAFI objectives.*
- *Monitoring performance of the industry and identifying objectives for the industry's evolving development needs.*
- *Mapping current industry support activities, identifying gaps, and resourcing the identified interventions.*
- *Monitoring and coordinating all support activities.*
- *Providing objective research for industry stakeholder engagements.*

Given that SAFI is a new venture, performance and impact monitoring is crucial to success. In addition to annual financial and various operational reports, performance updates are prepared on a regular basis (Isaacs, 2015). These range from impact studies and project evaluations to financial assessments and membership participation reports.

5.3.4 Financing & Budget

SAFI is funded administratively through private channels and operationally ('program specific funding') through public channels (Isaacs, 2015). Administrative funding is secured through a recently finalised financing arrangement with the South African Furniture Bargaining Council. Employees and employers in the furniture manufacturing sector make monthly contributions (levies) to the Furniture Bargaining Council in terms of the Labour Relations Act 66 of 1995. This payment, based on the number of employees, represents a financial contribution from both labour and employers. The object of this payment is to ensure that all participants in the furniture sector, which benefit from the bargaining council's impact, are entrusted with bearing the cost of this activity. The SAFI NEC has affiliated itself with the South African Furniture Bargaining Council (SAFBC) and has positioned itself as its "promotional or operational arm" (Isaacs, 2015). As such, SAFI now qualifies for financing through the SAFBC arrangement and does not charge members an additional membership fee.

Table 2: SAFI Budget Summary

(Source: SAFI Inaugural 3 Year Business Plan: 1st July 2015 to 30 June 2018, pp.24)

Annual Expenses (R '000)	**2016**	**2017**	**2018**	**Total**
Executive Governance and Management	1052.4	1042.6	1255.6	3350.6
Market Access Programme	1200	1884	2015.9	5099.9
Specialised Support Services Programme	750	802.5	858.7	2411.2
World Class Manufacturing Programme	850	1409.5	1508.2	3767.7
Supply Chain Optimisation Programme	300	1320.5	742.4	2362.9
Total	4152.4	6459.1	6380.8	16992.3
Annual Income (R '000)	**2016**	**2017**	**2018**	**Total**
Core Financial Support	2076.2	2583.6	1914.2	6574
Additional Income	2076.2	3875.5	4466.6	10418.3
Total	4152.4	6459.1	6380.8	16992.3

Project funding is sourced primarily from public sources, but the intention is to gradually phase out reliance on public financing (Isaacs, 2015). IPAP (2016) includes the furniture industry as one of the key sub-sectors identified in terms of public support programmes. The furniture industry was previously not in a position to collectively engage with government and certain opportunities were lost (SAFI, 2015c) and the creation of SAFI was partly driven by the need for a national furniture industry collective to engage with government. The SAFI Inaugural 3 Year Business Plan states that central to its core operations for the next three years (up to 2018) is securing of additional project funding from public and other non-governmental sources. The provisional SAFI budget for years ended 2016 – 2018 is presented in Table 2.

5.3.5 SAFI Operational Activities

SAFI maintains that the South African furniture industry is well established and can serve as a vehicle for value chain development, growth and employment creation (SAFI, 2015a). The business plan sets out a framework for facilitating programs and activities (referred to as: "deliverables") aimed at enhancing the performance of the entire furniture value chain, but focussed specifically on manufacturing. These support activities/deliverables are based on four 'strategic support pillars' as outlined in the SAFI business plan (see Figure 17).

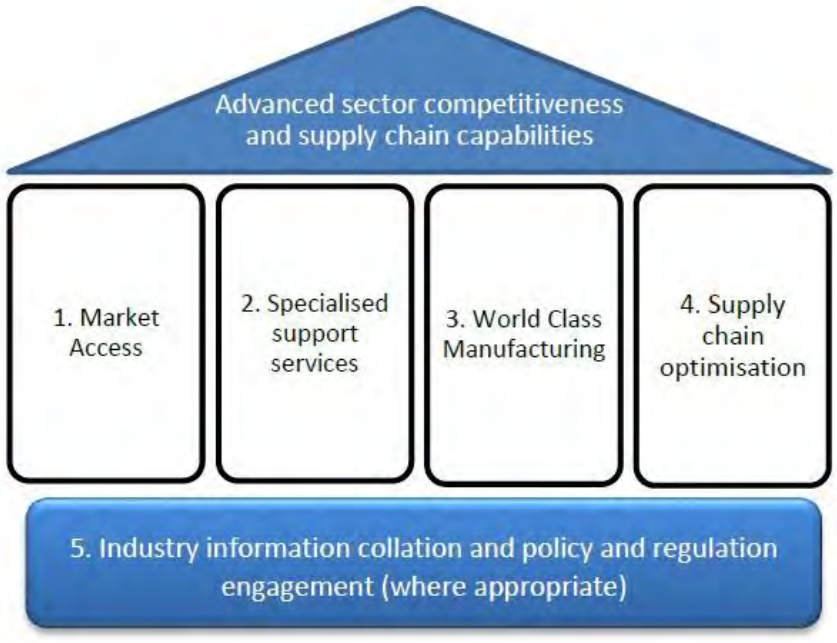

Figure 17: SAFI Strategic Pillars

(Source: SAFI Inaugural 3 Year Business Plan: 1st July 2015 to 30 June 2018, pp.10)

The strategic pillars make recognition of the challenges facing the furniture manufacturing industry and are aimed at advancing industry competiveness and supply chain capabilities (SAFI, 2015a). The four main promotional avenues are all based on gathering and organising industry information as well as through interaction with related industrial or cluster policies and regulatory frameworks (i.e. the foundation of the four pillars in Figure 17). Information regarding the objectives related to strategic pillars are summarised in Table 3.

Table 3: SAFI Business Plan Strategic Pillars and Related Objectives

(Source: SAFI Inaugural 3 Year Business Plan: 1st July 2015 to 30 June 2018, pp.13)

Pillar	Objectives
Market Access Programme	Increase domestic market share of 2015 base
	Increase furniture exports at a CARG of 10% per annum to 2020
Specialised Support Services Programme	Technical skills development
	Improvement of design skills and capabilities
	Increase product development capabilities
World Class Manufacturing Programme	Advanced lean manufacturing capabilities
	Material Costs: competitive costs versus international cost leaders
	Energy Costs: contained energy consumption and reduced costs
Supply Chain Optimisation	Optimise domestic and international supply chain linkages
	Increase local content (retail & manufacturing)

Detailed information regarding each of the specific activities related to various objectives can be found in the SAFI Inaugural 3 Year Business Plan (SAFI, 2015a, pp.13 – pp. 20). In terms of the valuation of CMO synergy, these objectives drive the activities that are responsible for the change in value between the collaborative and non-collaborative performance scenarios. Identification of sources of synergy is discussed in the next section.

5.3.6 Interview Responses and the Perceived Impact of Cluster Management Activity

In terms of cluster manager's interview responses, a number of insights were gained. A transcript of manager interview responses is provided in Appendix A.

In the cluster managers' view, SAFI is a national roll-out of the old WCFI programme. As such it aims to facilitate the delivery of value-adding programs to all furniture manufacturing sector participants in the South African furniture sub-sector. The objectives of the SAFI CMO are to act as representative

of all furniture value chain actors (specifically those in the manufacturing sector), to act as a platform for the implementation of strategic intervention, and to promote economic growth, competitiveness, innovation, and export opportunities. Additionally, goals and objectives are such as those outlined in the SAFI Inaugural Business Plan (SAFI, 2015a).

When asked about previous experience as a cluster manager, the SAFI interim CEO noted her cluster management career started in June 2009 with the initial registration of the WCFI CMO. Furthermore, the CMO manager also noted that many of the potential industry participants seem to lack a basic understanding of the clustering process and the specifics of CMO activity, specifically with regards to differentiating it from other forms of governmental support. The cluster manager, Mrs Bernadette Isaacs, specifically noted her perfection of a particular sports metaphor when confronted with the "so what is it you do exactly?" question (Isaacs, 2015) that often arises at promotional meetings involving new participants.

Furthermore, the CMO manager was asked to comment on the objectives of SAFI with reference to the 6 overarching objectives of CIs as outlined by Sölvell, Lindqvist & Ketels (2003. pp.11), i.e. (1) research and networking, (2) policy action, (3) commercial cooperation, (4) education and training, (5) innovation and technology, (6) cluster expansion. The SAFI CMO noted that operational objectives, as can be identified with reference to the 4 support pillars[3], included all of the abovementioned objectives. However, the innovation and technology objectives were, in her opinion, the one that received the least focus. This relatively low importance of innovation and technology objectives, in the cluster manager's opinion, is tied to public sector sources of funding and the requirement by the South African government to achieve political goals of transformation, job creation and wealth distribution. Investment in technological advancement objectives are frequently viewed as conflicting with social/employment based goals of public sector cluster sources of promotional funding.

In terms of the interview process related to industry members, participants mainly consisted of managers from privately owned, small to medium sized (SME), furniture manufacturers that have previously participated in prior WCFI (and/or are currently participating in SAFI), driven CI activity. Two of the respondents have also served as members on either WCFI or SAFI board of directors, which granted them a unique perspective on the potential for valuable impact between both their business and CMO activity.

[3] See also: 5.3.5 SAFI Operational Activities (pp. 98)

The industry interview process yielded mixed results with regards to the perceived impact of SAFI (and the prior WCFI) impact on regional furniture manufacturers. Some managers reported that participation was considered very successful whereas others were less impressed with the impact of CMO activity on their businesses. All but one of the company managers interviewed had a positive outlook with regards to participation in CMO activity. The respondent that had a less positive outlook on CMO participation mentioned travel costs and disappointments with regards to lacklustre attendance at meetings and seminars as main reasons for their intention to reduce participation in CMO activity. This participant was of the opinion that their time could be better utilised by focussing on their organisation.

Managers unanimously noted the difficulty with accurately determining the impact on their business of many CMO activities, specifically those related to industry-wide (or regional) activity of CMO operations. In fact, most managers seemed quite taken aback with the notion of accurately determining the value impact of CMO participation, stating that the impacts are to varied and wide in scope to "really value accurately". This holds true even though periodic impact assessments are frequently required for project funding. For example, one respondent mentioned that participation in CMO facilitated activity led to the development of a new strategic plan for their business. Five years later, the business is still operating in accordance with this vision and the situation would have been "drastically different" if the company had never participated in that particular activity. The notion of determining the ultimate value to the company of participation in that single activity was in this manager's opinion "not really possible".

Furthermore, once the research process was explained, it became clear that none of the interviewed parties had ever used the DCF valuation method before. Company managers were generally aware of the time value of money concept and the practice of determining present values by applying a discount factor (which was usually referred to as an inflation, interest, or cap rate). However, the fundamental premise of determining the intrinsic value of an asset or business by discounting the series of cash flows associated with that asset or business was new to all respondents. This is most likely due to the specialized nature of this valuation technique and that fact that none of the interviewed furniture manufacturer managers had a strong financial background. Most of these managers are self-taught business men and women or have qualifications in fields such as design or engineering.

In terms of determining the impact on cash flows related to the participation in specific CMO activities, company managers were presented with the list of variables required for financial modelling as applied in Section 5.5.4 and 5.5.5 (See: Appendix B). However, this was a misjudgement

on behalf of the researcher, as none of the participants were willing or able to provide detailed expected financial impact information resultant of CMO impact. Subsequently, most of the impact data used in the illustrative example was obtained by the researcher during the interview process by specifically focusing on single activities (e.g. a design competition) and obtaining manager responses on a cost-benefit approach by asking managers to list the costs and benefits (both financial and non-financial) that they associate with participation in CMO activity.

Finally, one industry respondent commented on involvement in a prior attempt at developing a privately-initiated cluster-inspired furniture manufacturing hub during the late 1990's and early 2000's. This process was initiated in response to the observation that small and medium sized local manufacturers were struggling to remain competitive as a number of furniture factories closed down increased during the 1990's. The main idea of this cluster-inspired production network was to create an international standard finishing plant that could source large contracts in foreign markets. The aim was to then utilise this resource as a means to feed work back into the local industry through a process of sub-contracting certain elements of production to local manufacturers. The initial idea was to compete, not only on price efficiency through the use of scale economies, but also through collaborating in terms of design and through the utilisation of high quality product finishing. In other words, in addition to cost efficiencies, innovative channels were to be one of the primary sources of competitive advantage. Unfortunately, this attempt at a cluster-inspired production network failed and closed down in the mid 2000's. Key reasons cited by the respondent was the inability of local manufacturers to "get rid of the low-cost-high-volume business model mentality" that had been the status quo in the local furniture industry for many years. Before long, this highly advanced finishing plant had reverted to churning out cheap items for overseas markets. Furthermore, this respondent also commented on the high levels of dis-trust in the local industry, where actors are sceptical of any program that may "steal their work" and where other industry participants are viewed as "the competition" as opposed to "potential partners".

5.4 Value drivers and Sources of Synergy

Synergy can be classified as originating from operational or financial sources (Damodaran, 2005). Operating synergy includes cost efficiencies and revenue enhancements due to operational similarities between participants. Operational sources generally impact free cash flow (FCFF) and terminal value (TV) components of the DCF framework. Financial synergies are more common in M&A transactions and accrue due to the process of consolidation (unification of businesses).

Financial synergies may include cash flow effects and also involve all those effects that impact the cost of capital (WACC) of the post-collaboration entity.

However, translating the impact of SAFI activity into DCF value drivers is by no means an easy task. The potential management benefits at play are numerous, wide ranging, and may take a long time to materialise. SAFI has a diverse operational mandate including all of the main objectives identified by Sölvell, Lindqvist & Ketels (2003). Furthermore, identifying all the participants that are impacted by SAFI is difficult, not only due to the broad scope of operational activities, but also by the number of actors tied to SAFI activity.

In order to avoid the Impact Problem (Sölvell, 2008) a source of synergy (operational or financial) has to be directly attributable to a specific CMO service by establishing a causal link between the source and firm-specific DCF value driver. However, even though certain support services and activities (sources) can be directly linked to a specific firm and its value drivers, much of the SAFI cluster management process involves industry-wide attempts at stimulating the evolution of the cluster business environment. Many of the research and information collation activities proposed by SAFI will have an indirect effect on firm level financial value drivers. Establishing a causal link for these activities will be much more difficult. Furthermore, certain non-financial factors (e.g. knowledge creation, social development, and trust building) are considered crucial for SAFI success. These factors are difficult, if not impossible, to accurately translate into pure cash flow terms.

Identification of specific services and activities are guided by SAFI's four main overarching strategic support programs ('pillars of support') as per the SAFI Inaugural Business Plan 2016-2018. These programmes represent the four main avenues of support. Objectives, actions and intended outcomes of these programmes will impact firm-level value drivers.

Table 4: SAFI Market Access Budget

(Source: SAFI Inaugural 3 Year Business Plan: 1st July 2015 to 30 June 2018, pp.15)

Market Access Programme Budget (R '000)	**2016**	**2017**	**2018**	**Total**
SA market review and opportunities implementation	1200	1884	2015.8	**5099.8**
African market review and opportunities implementation	600	642	686.9	**1928.9**
Facilitation of SA buyer-supplier engagements	0	200	214	**414**
Facilitation of international buyer-supplier engagements	0	400	428	**828**
Total	**1800**	**3126**	**3344.7**	**8270.7**

The primary objective of the market access plan is to increase local market share and increase exports by 10% per annum through 2020. Market access plan budgetary allocations are presented in Table 4. This programme is predominantly focussed on revenue enhancement by increasing access to local and foreign markets, development of a clear product point of difference (PoD), and developing strategic relationships. Four market access activities are planned. First, (1) a review of local markets aimed at improving local market share. This is to be followed by a (2) review of regulatory and trade environment impacting on markets in Sub-Saharan Africa. Subsequently, SAFI will focus on facilitating large buyer-supplier meetings, first for (3) export markets and then for (4) local procurement opportunities.

Table 5: SAFI Specialised Support Services Budget

(Source: SAFI Inaugural 3 Year Business Plan: 1st July 2015 to 30 June 2018, pp.16)

Specialised Support Services Budget (R '000)	**2016**	**2017**	**2018**	**Total**
Technical skills development	250	267.5	286.2	**803.7**
Design skills and capabilities	250	267.5	286.2	**803.7**
Pre-production skills and capabilities development	250	267.5	286.2	**803.7**
Total	**750**	**802.5**	**858.6**	**2411.1**

Specialised support services are aimed at technological and skills development in the furniture value chain due to the limited use of advanced technologies and low skill levels observed. Specialised support services programme budgetary allocations are presented in Table 5. Specific objectives under this pillar include the development of technical skills, improving design capabilities, and upgrading production and pre-production processes. Three activities have been identified and budgetary allocations for technical, design and pre-production have been made. The first is targeted at technical skills development. The second is focussed on furniture and associated manufacturing, design and technological skills. The last involves pre-production technological development. Participation in these activities is expected to generate cost synergies where skills development leads to increases in efficiencies. There is also revenue potential if skills development allows local participants access to new markets.

Table 6: SAFI World Class Manufacturing Budget

(Source: SAFI Inaugural 3 Year Business Plan: 1st July 2015 to 30 June 2018, pp.18)

World Class Manufacturing Budget (R '000)	2016	2017	2018	Total
Lean implementation support programme	350	374.5	400.7	**1125.2**
Lean management and team leader skills development	250	267.5	286.2	**803.7**
Competitive materials research and recommendations	0	500	535	**1035**
Energy reduction support programme	250	267.5	286.2	**803.7**
Total	**850**	**1409.5**	**1508.1**	**3767.6**

World class manufacturing is targeted at greater cost efficiency and higher productivity, both of which imply cost reductions and increased returns over net assets. Budgetary allocations for world class manufacturing are presented in Table 6. The goal is to establish a lean and energy efficient South African production system that can compete internationally by means of competitive materials costs. Intended outcomes include lower production costs, enhanced quality and reliability, reduced material costs and better use of waste, reduced energy consumption, and lower logistics costs. Four individual activities have been created under this strategic directive: Lean Implementation, Lean Management Skills Development, Competitive Materials Research, and Energy reduction.

Table 7: SAFI Supply Chain Optimisation Budget

(Source: SAFI Inaugural 3 Year Business Plan: 1st July 2015 to 30 June 2018, pp.20)

Supply Chain Optimisation (R '000)	2016	2017	2018	Total
Logistics programme	0	500	200	**700**
Retailer QR model piloting and roll-out	250	267.5	286.2	**803.7**
Supply chain systems support	0	500	200	**700**
SMME support programme	50	53	56.1	**159.1**
Total	**300**	**1320.5**	**742.3**	**2362.8**

Finally, supply chain optimisation includes collaborative economies of scale and scope elements, as well as improvements to the local competition and response times. Table 7 outlines budgetary allocations for the supply chain optimisation programme. The aim is to streamline the furniture production and retail value chains and to optimise linkages to domestic and international markets.

The outcomes include reduced logistics costs, increased local market share and process upgrading and product diversity through technological advancement. Specific activities include a review of logistics status quo and reporting on findings, improving retailers' quick response ability, SMME development and technological improvements.

5.5 Calculating Synergy – XYZ Company Illustrative Example

This illustrative numerical example demonstrates application of the CMO synergy valuation framework developed in Chapter 3. As is case in the SAFI scenario, this example assumes that the decision to commence CMO operations has already been made. Given this scenario the valuation framework is applied ex-ante as a capital budgeting tool to inform the cluster members' decision to participate, or not participate, in the proposed CMO services and activities. Firm-specific synergy is calculated as the difference in value of the individual firm between the collaborative and isolated performance scenarios as discussed in Chapter 3.

As mentioned prior, industry respondents involved in the case study data collection interviews mainly consisted of managers of privately owned, small to medium sized (SME), furniture manufacturers that have previously participated in prior WCFI (and/or are currently participating in SAFI), driven CI activity. Two of the respondents have also served as members on either WCFI or SAFI board of directors, which granted them a unique perspective on the potential for valuable impact between both their business and CMO activity.

However, as privately owned SMEs, the financial information of respondent furniture manufacturing businesses' are not publically available. Furthermore, most of the interviewed managers had concerns with regards to sensitive financial information and, due to the scope for public availability of this research document, the potential for other cluster actors (i.e. entities that are perceived as direct competitors) to gain unfavourable insights into their operations.

In order to avoid the use of sensitive financial information, the numerical example provided here makes use of an exemplary furniture manufacturer, XYZ Company. Interview participants were asked to comment on the perceived impact of participation in CMO activities and a few business managers provided financial statements. These financial statements and interview responses were used to develop the data contained in the XYZ Company's example.

5.5.1 The Cluster Members' Firm-Specific Capital Budgeting Decision

As discussed in Chapter 3, the activity of cluster promotion via a CMO can be visually illustrated as per Figure 9 (restated below). The left hand side of Figure 9 represents scenarios where a regional cluster has formed, but no CI has been created and no CMO activity is present. The right hand side represents the collaborative scenario with active CMO driven collaboration happening in the CI. When the decision to commence CMO operations is made (i.e. the movement from left to right in Figure 9), each cluster entity (M_i) faces a capital budgeting decision; either participate in CMO activity, or remain isolated.

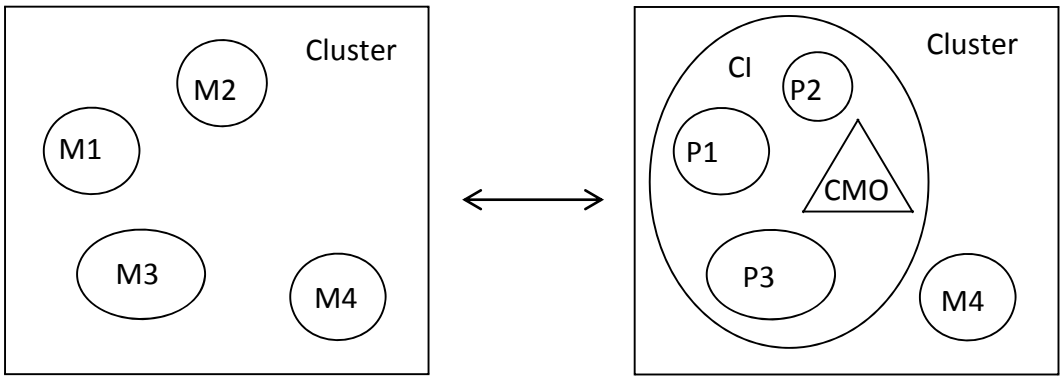

Figure 9: Graphical Representation of Basic CI/CMO Model

(Source: Own Illustration)

In Figure 9 above, entities M_1, M_2 and M_3 are representative of cluster actors that choose to actively participate in CMO services and become official members of the CI. This direct participation in CMO driven cluster promotional activity is represented with a change in label from M_1, M_2 and M_3 to P_1, P_2 and P_3 on the right hand side of Figure 9. Alternatively, also included, is entity M_4. This represents a cluster member that remains independent and does not become an official CI member and is depicted outside the CI sphere of influence.

In Chapter 3, the value of firm-specific synergies resulting from CMO collaboration by individual cluster members is calculated as per Equation [3.6] (restated here),

$$\Delta V_{Pi} = V_{Pi} - V_{Mi}'. \qquad [3.6]$$

Where; Mi' represents the isolated state entity corresponding to the appropriate Pi'.

The equation evaluates the change in firm value between the scenarios depicted on the right hand side (i.e. the collaborative scenario, V_{Pi}) and the left hand side (i.e. the isolated scenario, $V_{Mi}{}'$) of Figure 9. However, given the assumption that CMO activity will commence the isolated state for this valuation scenario is not completely void of any CMO activity.

The wide scope and impact of CMO activities have an indirect (i.e. regional/industrial) effect on all cluster members, including non-CMO affiliated entities (e.g. M_4). For example, the SAFI annual report (SAFI, 2015c) outlines the Furniture Qualifications Development (FQD) project. SAQA (the South African Qualifications Authority), the regulatory body for occupational qualifications in the South African furniture industry, is in the process of migrating to a new QCTO (Quality Council for Traders and Occupations) format. Due to the high degree of industry specific technicalities involved with this migration, SAFI was charged with management of the restructuring to ensure future qualifications compliance to the new QCTO format. All furniture manufacturing entities in the country are impacted by this migration, regardless of their official affiliation with SAFI and other cluster development activities. The FQD project is therefore has an indirect impact all cluster actors, even though the individual firm was not engaged in any identifiable transaction, and it is therefore entirely possible for companies that elect not to become part of the cluster to benefit from the CMO's creation.

Alternatively, the SAFI annual report (SAFI, 2015c) outlines the Recognition of Prior Learning Project (RPL) a SAFI facilitated activity aimed at assessing occupational skills of participating CI firms. Fibre Processing & Manufacturing Sector Education and Training Authority (F&PMSETA) accredited third party analysts were used to evaluate vocational skills in a number of woodworking trades. Assessment reports produced in the evaluation process outlined the existing skills and identified any skills shortages which enabled managers to inform strategic decision making. Resultantly, due to the direct involvement of individual actors in an identifiable transaction, the RPL project is an example of an activity that involves direct participation.

Even though independent entities (such as M_4 in Figure 9) are not direct participants in CMO activities (e.g. RPL project above), the fact that CMO activity has commenced and will run its course presents the possibility for indirect impacts on non-CI cluster actors (e.g. FQD project above). The assumption that CMO activity will go ahead, causes all furniture manufacturing sector actors to face altered business environment conditions. Consequently, the firm-specific capital budgeting decision

should account for indirect impacts, should the individual choose not to become officially affiliated with the CI and participate in CMO activity.

Figure 9 can be adjusted, as represented in Figure 18, to account for the XYZ Companies capital budgeting decision.

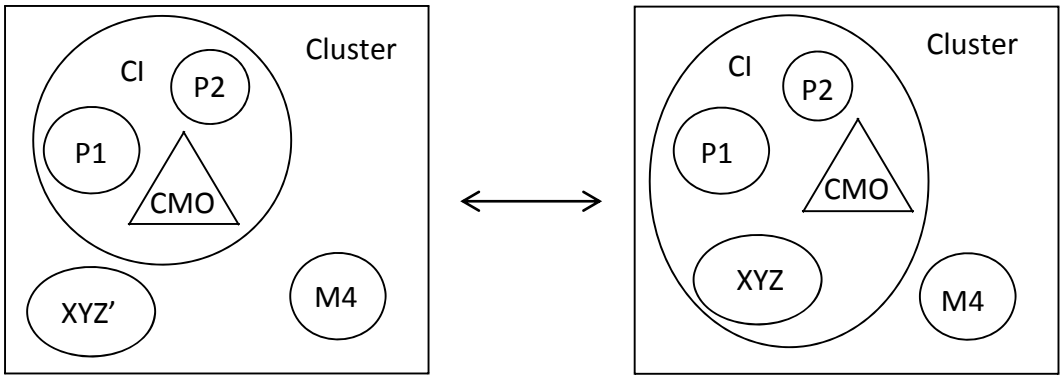

Figure 18: Graphical Representation of XYZ Company Capital Budgeting Decision

(Source: Own Illustration)

Figure 18 reflects the firm-specific isolated and collaborative scenarios cases present in the XYZ Companies capital budgeting decision. Isolation, on the left hand side, assumes no direct participation in CMO activity. However, the value of XYZ Company in the isolated scenario should include a provision for expected changes in business environment conditions associated with CMO activity. Alternatively, the right hand side depicts XYZ Company as a direct participant in CMO activity. Firm-specific valuation in this scenario includes both direct and indirect impacts of CMO activity.

Restating Equation [3.6] for the XYZ Company example yields Equation [5.1],

$$\Delta V_{XYZ} = V_{XYZ} - V_{XYZ}'. \qquad [5.1]$$

This states that synergies accruing to XYZ Company (ΔV_{XYZ}) equals firm value in collaboration (V_{XYZ}), less firm value in isolation (V_{XYZ}'), where isolation includes a provision for indirect impacts. All things being equal, the difference in XYZ Company's value between the two performance scenarios yields firm specific synergy resultant of the CMO activity.

5.5.2 Determining Firm Value

Business entities, as identified by Damodaran (2006), comprise two asset classes; assets-in-place are the existing assets the business owns and uses to generate profits, and growth-assets are the potentially valuable investments that the business can make in the future. Assets-in-place are relatively easy to identify using historical financial information. Alternatively, growth-assets are harder to identify due to uncertainties related to potential future investments. Furthermore, given the common practice of assuming perpetual continuation of business entities for valuation, growth-assets may contribute significantly to firm value.

Furthermore, in the CMO synergy valuation case, given the long term nature associated with cluster activity and the focus on knowledge-based improvements and innovation (which in itself if difficult to accurately identify and quantify), growth assets form a substantial component of potential synergy benefits that may accrue to participants.

Resultantly, given the value implications, medium and long term strategic goals and objectives of the participant is an important consideration due to the potential future impact of reinvestment activities on growth-assets. Manager interviews informed the identification of potential growth assets related to future prospects in the furniture industry included in the XYZ Company example. Historic financial statements provided by a number of respondents were used to identify a general corporate structure for furniture manufacturers and to model appropriate assets-in-place into the illustrative example.

Firm value, in both the collaborative and isolated cases, is determined using the DCF method. The DCF valuation process is discussed in detail in Section 2.5 and a brief recap is provided here. DCF determines business value as the sum of the present value of all periodic Free Cash Flows to Firm (FCFF), discounted by the Weighted Average Cost of Capital (WACC) over the forecast time period. A terminal value (TV) component is added in the final year of discounting to account for long term impacts and indefinite, and assumed perpetual, lifetime of business entities as in Equation [2.8],

$$V_{XYZ}\ and/or\ V_{XYZ}{}' = \sum_{t=1}^{t=n} \frac{FCFF_t}{(1+WACC)^t} + \frac{Terminal\ Value}{(1+WACC)^n}. \qquad [2.8]$$

FCFF is calculated by first taking earnings before interest and tax (EBIT), adjusted for the effective marginal tax effect to re-include the cash flows attributable to bond holders (1-t), and adding non-cash charges (NCC). Subsequently, capital expenditure (Capex) and the working capital charge (WC) are deducted to exclude business reinvestment costs as illustrated in Equitation [2.9] (restated here),

$$FCFF = EBIT(1-t) + NCC - Capex - \Delta WC \qquad [2.9]$$

In terms of synergy valuation, both operational and financial synergies have to potential to impact FCFF. Differences in the expected revenue, costs, tax effects, non-cash charges and reinvestment cost will result in a different value obtained between the isolated and cooperative performance scenario.

As per the general accounting framework (i.e. Assets = Equity + Liabilities), the financing for business activity arise from both debt and equity sources. The discount rate used should reflect the cost of capital of the business. WACC is calculated as the market related weighted average cost of equity and the after tax cost of debt (borrowings) as in Equation [2.13] (restated here),

$$WACC = \frac{MV_d}{(MV_d+MV_e)}.r_d(1-t) + \frac{MV_e}{(MV_d+MV_e)}.r_e \ . \qquad [2.13]$$

Potential financial synergies may impact the marginal tax rate, debt/equity ratio, or the required return of debt or equity (e.g. diversification effect). Financial synergies are more prevalent in M&A transactions due to the consolidation process. However, given the wide scope for CMO activity, care should be given to identify any impacts on WACC.

Furthermore, the process of estimating future cash flows and discount rates is broken into two time-periods, the forecast period and a terminal value (TV) component. During the forecast period the analyst has to estimate periodic cash flows (FCFF) and related discount rates (WACC). This example assumes an annual approach. The TV component is based on a steady state cash flow assumption and includes long term cash flow effects that fall outside the forecast period, as in [2.12] (restated here),

$$TV = \frac{FCF^{SS}}{(WACC-g)} \ . \qquad [2.12]$$

Due to its perpetual nature, the TV often represents the bulk of the value in the DCF calculation. Furthermore, given the long term focus often associated with cluster activity, selecting an appropriate steady state cash flow and perpetual growth rate that includes the potential for growth-assets (as mentioned above) may be difficult.

5.5.3 Financial Modelling

The ex-ante financial modelling process uses historical financial statements to set a baseline for estimates of future performance. In order to determine firm value the key accounting line items used to determine DCF input variables (FCFF and WACC) have to be estimated over the forecast period. As opposed to determining the change in each individual line item, the financial modelling process used in this example uses operational variables and accounting ratios (e.g. gross margin, expected revenue growth, debtor days, etc.) as primary value drivers for estimation purposes. The historical financial statement information for XYZ Company is presented in Appendix C.

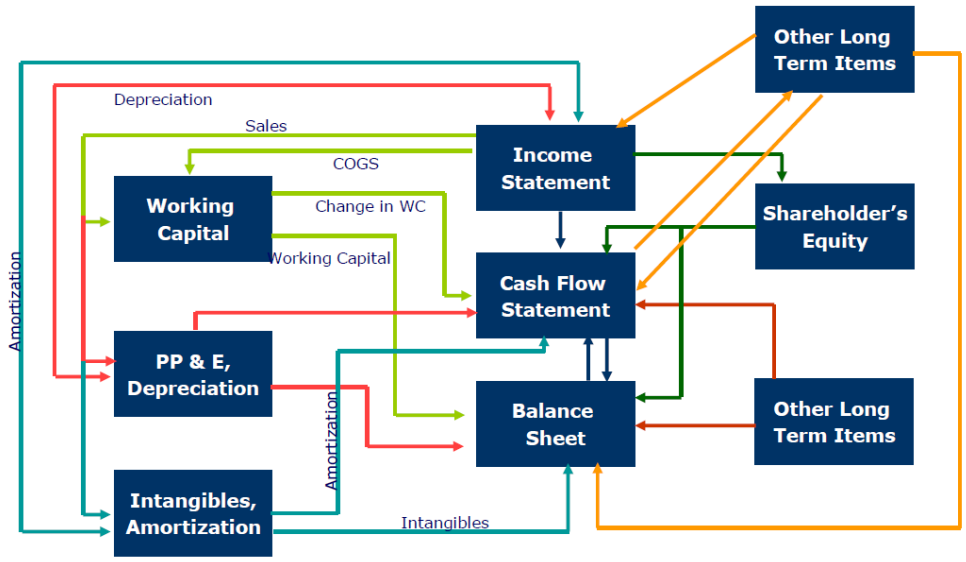

Figure 19: Illustrative flow of funds

(Source: Corporate Bridge Financial Modelling E-book Part 4 of 4, pp.17)

Figure 19 illustrates the flow of funds in the financial modelling process. the process of forecasting the core financial statements is facilitated through the use of a number of supporting schedules. The Working Capital Schedule addresses the impact of (and changes in) working capital line items such as accounts receivable, inventory, accounts payable, etc. The Depreciation Schedule accounts for capital expenditure and asset sales; it is used to determine the annual expected depreciation charge over the forecast period. The Other Long Term Items schedule is used to incorporate the impact of non-PPE assets and liabilities, such as deferred tax and pension costs. The Debt and Interest Schedule is used to calculate the impact of new debt issuance, debt repayments and related interest

charges. Finally, Shareholder Equity and Shareholders Outstanding Schedules are used to incorporate the effect of new share issuances, buybacks, dividends and the impact of dilutive securities (e.g. share options).

The creation of performance scenarios assumes the outside in approach by first evaluating economic and industrial conditions and then looking specifically at CMO impact. Economic and industry conditions are discussed in greater detail in Section 5.2 and the CMO is analysed in section 5.3.

In terms of the general macroeconomic outlook, the World Bank (2015) notes that the South African economy (GDP) is expected to grow at 2%. This growth figure provides an indication as to the long term growth potential of local manufacturers. However, the OECD (2015) reports that government spending is curbed due to high levels of public debt. This is expected to have a negative impact on growth, especially due to the fact that South African government spending accounts for a substantial portion of GDP at 39% (World Bank, 2015). Furthermore, high energy, housing and food prices are driving up inflation and are expected to translate into higher operational costs for local firms. Finally, the weakening rand will however provide some competitive relief for exporters.

WESGO (2014) reports that since the 2008 financial crisis the global furniture industry has displayed a strong upward trend with year-on-year growth recorded at 20% in 2012. It is assumed in the valuation that this growth trend is persistent, especially in light of public policy support for the furniture manufacturing industry. Additionally, the South African furniture industry has become increasingly export orientated since the late 1990's and exports will be positively impacted by the weakening rand. Europe is still one of the South African furniture sectors main foreign destinations, but the African market is becoming a more significant source of revenue.

In the SAFI case, as was identified in Figure 17 (Section 5.3.5), the primary aim of support activity is to improve sector competitiveness and supply chain capabilities by addressing constraints facing the furniture industry. This goal is to be facilitated by means of the four promotional support pillars identified in the SAFI Inaugural Budget (SAFI, 2015c): (1) Market Access, (2) Specialised Support Services (3) World Class Manufacturing, and (4) Supply Chain Optimisation. In addition to these SAFI has a fundamental operational objective of collating industry information and engaging (or acting as facilitator for engagements on behalf of industry) government. This foundation serves as base for other CMO support activities. The programmes, services and/or activities associated with each of these support pillars is identified as the sources of synergy for use in valuation. The aim of the valuation process is to identify the impact (both direct and indirect) of these activities on the firm-level DCF value drivers of participants.

Project level information regarding specific activities in the SAFI case is not available, so this illustrative example draws on the objectives of the four primary SAFI support pillars as outlined in Table 3 (Section 5.3.5) and discussed in greater detail in Section 5.4. The Market Access plan is predominantly aimed at revenue enhancement. The Specialised Support Services pillar is aimed at improving technical, design, and pre-production skills in the furniture sector. Participation in these activities is expected to generate cost synergies where technical skills development leads to increased efficiencies. There is also upside revenue potential if design and skills development allows local participants access to new markets through upgraded product offerings. The World Class Manufacturing pillar is mainly targeted at improved cost efficiency and higher productivity. This would result in cost reductions and increased returns on net assets. The Supply Chain Optimisation Pillar focuses on collaborative elements and is expected to result in economies of scale and scope, as well as improving local competitiveness and response times. Finally, the impact of industry information collation and government (policy and regulatory) interaction is twofold. Information collation will enable SAFI to identify specific strengths and weaknesses which will allow better, more tailored and more efficient promotional strategies to be developed. Furthermore, given the focus on cluster development on a public policy level as identified in the IPAP for 2016, as well as the public funding base for SAFI project budgets, engagement with policy and regulatory actors forms the main enabling factor for all support activity.

5.5.4 Isolated Performance Scenario

Table 8: Forecasted Isolated State Income Statement Margins for XYZ Company

Income Statement Forecast Margins	**20x4**	**20x5**	**20x6**	**20x7**	**20x8**
Gross Margin	31%	32%	32%	33%	33%
SG&A as % of Net Sales	26%	25%	25%	24%	24%
Other Income as % of Net Sales	0%	0%	0%	0%	0%
Other Expense as % of Net Sales	0%	0%	0%	0%	0%
Income Statement Forecast Growth Rate	**20x4**	**20x5**	**20x6**	**20x7**	**20x8**
Net Sales Growth	2%	3%	3%	4%	4%

Table 8 contains the Income Statement forecast variables used for the isolated performance scenario. After total SA furniture sales plateaued in the past 3 years since 2012, the impact of indirect CMO participation is included in this performance scenario as a gradual increase in sales growth resulting from the spill-over effects of market access programs and design skills upgrades.

Furthermore, the gross margin is increased slightly over the forecast period to model the effect of increased cost efficiency attributed to the World Class Manufacturing and Specialised Support Services Programmes. As participant entities improve skills, design and technological ability, and competitiveness, those firms not directly participating will have to increase their own efficiencies to remain competitive. Sales, general and administrative (SG&A) expenses are gradually decreasing to include the impact of operational efficiency resulting from increased competition in the local market. In order to retain model simplicity it is assumed that other income and other expenses are zero throughout the forecast period. Furthermore, as SME manufacturers, financial statements obtained from interview participants did not often reflect recurring other income sources, these were more often than not once off events related to asset disposals or loans to members.

Table 9 (next page) contains the forecast variables as per the supporting schedules used in the financial modelling process for the isolated performance scenario (left hand side in Figure 18). Working Capital ratios, including accounts receivable, accounts payable and inventory days, are assumed constant at the historical three year average trend level. Net working capital and changes in working capital are calculated over the forecast period based on these ratios.

The depreciation schedule addresses capital expenditure on PPE assets and the related depreciation charges. Capital expenditure of R15 000 and R 20 000 was included in the first (20x4) and fourth (20x7) years of the forecast period respectively. This was done in order to simulate expected capital reinvestment associated with maintaining operations and represents a machinery upgrade that would take place regardless of participation in CMO activity. Depreciation is calculated on the straight line method with an estimated useful life for new PPE assets of five years, with two years remaining on existing historical PPE assets. It is assumed that there are no residual values on PPE items. For model simplicity, other long term assets and liabilities are assumed to remain constant at zero throughout the forecast period.

The debt and interest schedule addresses long term borrowings, interest expense and interest income. It is assumed that a long term loan of R20 000, at an interest rate of 12%, is taken out to finance capital expenditure of R15 000 mentioned above. Finally, it is assumed that XYZ Company maintains a 20% dividend pay-out ratio during all profitable years. This is based on historical average of 18% and is adjusted upwards slightly, due to the increases in expected sales and operating margins, resultant of CMO spill over effects.

Table 9: Forecasted Isolated State Supporting Schedules for XYZ Company

Working Capital Schedule	**20x4**	**20x5**	**20x6**	**20x7**	**20x8**
Accounts Recievable Days	8	8	8	8	8
Inventory Days	46	46	46	46	46
Other Current Assets % of Net Sales	0%	0%	0%	0%	0%
Accounts Payable Days	35	35	35	35	35
Accrued Liabilities % of GOGS	0%	0%	0%	0%	0%
Other Current Liabilitiues % of COGS	0%	0%	0%	0%	0%
Net Working Capital	10 156	10 387	10 699	11 048	11 490
Change in Working Capital	10 474	231	312	349	442
Depreciation Schedule	**20x4**	**20x5**	**20x6**	**20x7**	**20x8**
Capital Expenditure	15 000	-	-	20 000	-
Asset Sales and Write-Offs	-	-	-	-	-
Usefull Life - Existing PPE					
UsefulL Life - New PPE (paired with Capex)	5	5	5	5	5
Depreciation Charge	1 973	3 237	3 442	5 221	7 110
Other Long Term Items Schedule	**20x4**	**20x5**	**20x6**	**20x7**	**20x8**
Other Long Term Assets	-	-	-	-	-
Increase/Decrease In Long Term Assets	-	-	-	-	-
Other Long Term Liabilities	-	-	-	-	-
Increase/Decrease In Long Term Liabilities	-	-	-	-	-
Debt and Interest Schedule	**20x4**	**20x5**	**20x6**	**20x7**	**20x8**
Long Term Debt					
Opening Balance	-	20 000	15 000	10 000	5 000
Issuance	20 000	-	-	-	-
Repayment	-	-5 000	-5 000	-5 000	-5 000
Closing Blance	20 000	15 000	10 000	5 000	-
Interest Rate on Long Term Debt	12%	12%	12%	12%	12%
Interest Expense	1 200	2 100	1 500	900	300
Cash					
Average Balance	5 491	8 757	14 052	11 940	12 864
Interest Rate on Cash	3%	3%	3%	3%	3%
Interest Income	137	219	351	299	322
Shareholders Equity Schedule	**20x4**	**20x5**	**20x6**	**20x7**	**20x8**
Assumed current year EPS multiple	4	4	4	4	4
Shares Repurchased	0	0	0	0	0
Total Dividends Paid	1 275	1 732	1 882	2 562	2 515
Dividend Payout Ratio	20%	20%	20%	20%	20%

Using the information included in the supporting schedules, a forecasted Income Statement, Balance Sheet and Cash Flow Statement can be prepared in order to obtain the input variables for use in DCF valuation. Table 10 contains the projected DCF input variables over the forecast period and calculates isolated state firm value. FCFF is calculated as tax adjusted earnings, plus the depreciation charge, less capital expenditure and changes in working capital. FCFF equation inputs are taken

directly from the forecasted financial statements for each year in the forecast period (20x4 – 20x5). The calculation of FCFF for XYZ Company can be seen in Table 10.

In terms of calculating the discount rate, WACC, the changes to the debt equity ratio, as well as required returns on debt and equity, will impact the discount rate used in DCF. The debt equity ratio is decreasing over the forecast period as the long term loan is paid off. The required return on debt is set equal to the equal to the interest rate at which the long term loan is taken out (12%). The required return on equity can be calculated in multiple ways, including the application of the Capital Asset Pricing Model (CAPM) or by looking at investments with a similar risk profile.

Table 10: DCF for the Isolated Performance Scenario

DCF Input Variables for XYZ Company	**20x4**	**20x5**	**20x6**	**20x7**	**20x8**
FCFF Calculation	4 587	13 019	13 366	-1 886	19 230
EBIT	9 916	13 908	14 217	18 391	17 446
Tax Rate	28.00%	28.00%	28.00%	28.00%	28.00%
Non-Cash Charges	1 973	3 237	3 442	5 221	7 110
Capital Expenditure	15 000	-	-	20 000	-
Change in Working Capital	-10 474	-231	-312	-349	-442
WACC Calculation	12.71%	13.10%	13.47%	13.86%	14.17%
Value of Debt	35 733	30 970	26 449	21 855	17 530
Value of Equity	11 067	17 994	25 521	35 768	45 830
Required Return on Debt	12%	12%	12%	12%	12%
Required Return on Equity	15%	15%	15%	15%	15%
Terminal Value Calculation					158 008.66
Steady State Free Cash Flow					19 230
Constant Growth Rate					2%
Firm Value Calculation	4 070	10 177	9 148	-1 122	91 369
t	1	2	3	4	5
FCFF	4 587	13 019	13 366	-1 886	177 238
(1+WACC)^t	1.1271	1.2792	1.4611	1.6808	1.9398
Firm Value **113 642**					

Case study participants were privately owned companies and CAPM beta coefficients were not publically available. In this example a required return on equity of 15% has been arbitrarily selected

for XYZ Company. It should be noted that calculating the required return on equity for use in financial valuations is a widely researched topic. An in-depth discussion regarding the accurate estimation of required return on equity falls outside the scope of this study.

In short, CAPM beta can be calculated by dividing the covariance of share returns and market returns with the variance of market returns (see Section 2.5.6), but this method requires historical returns information and is usually only available in the case of public companies. If company managers, who are assumed to have access to this returns information for their own companies, are willing to share it in the cluster sphere, accurate beta coefficients for private firms can be calculated. Alternatively, the required return on equity that is publically associated with other investments of a similar risk profile can be used as proxy.

The terminal value component is based on a steady state cash flow equal to that for the final year of the forecast period (20x8). A conservative constant growth rate of 2%, matching expected GDP growth, is applied in the isolated performance scenario. Finally, firm value for the isolated performance scenario can be determined. A value of R113 642 is obtained as the current value of XYZ Company.

5.5.5 Cooperative Performance Scenario

The cooperative performance scenario includes the impacts of direct participation by XYZ Company. Table 11 outlines the income statement forecast variables used in financial modelling for the cooperative performance scenario.

Table 11: Forecasted Cooperative State Income Statement Margins for XYZ Company

Income Statement Forecast Margins	**20x4**	**20x5**	**20x6**	**20x7**	**20x8**
Gross Margin	31%	33%	33%	34%	35%
SG&A as % of Net Sales	26%	24%	24%	23%	23%
Other Income as % of Net Sales	0%	0%	0%	0%	0%
Other Expense as % of Net Sales	0%	0%	0%	0%	0%
Income Statement Forecast Growth Rate	**20x4**	**20x5**	**20x6**	**20x7**	**20x8**
Net Sales Growth	3%	5%	4%	4%	4%

The impact of direct CMO participation in the Market Access plan activities is modelled by increasing year-on-year sales growth to a greater extent than was done for the isolated state. Interview participants that were party to a previous WCFI trade mission to Ghana commented on the revenue and growth potential unlocked in establishing international connections through participation in this programme. Due to the industries weak global competitiveness on non-price related areas of contention (quality, reliability, design skills), as well as distance to large markets in Europe, America and China, better technical and design capabilities facilitated through the Specialised Support Services programme also increases future upside revenue potential.

One industry respondent commented many foreclosures and the inability of many smaller furniture manufacturers, who historically focussed on traditional solid wood designs, to adapt to changing market conditions during the 1990's and early 2000's. Improving the competitiveness at which local manufacturers can acquire materials as well as improving the range of materials used in the local production sector is expected to increase both revenue potential and decrease costs.

In addition to the cost impact of reduced materials costs, a higher gross margin is used to incorporate the impact of increased cost efficiency attributed to the World Class Manufacturing and Supply Chain Optimisation programmes. Programmes aimed at reducing operating costs are aimed at increasing local and international competitiveness and minimising wastage by better utilising resources and potential by-products of the production process (e.g. selling, as opposed to throwing away, waste materials). Programmes aimed at reducing energy consumption, and by extension energy costs, will have a large impact on operating margins due to the recent and expected increases in electricity price in South Africa.

Sales, general and administrative (SG&A) expenses are also modelled as decreasing over the forecast period to include the impact of increased efficiencies resulting from increased competition in the local market. However, direct participation in CMO activities often requires some form of administrative cost (in terms of money and time). Interview respondents mentioned specifically the time and cost associated with travelling to meetings. Furthermore, one industry representative who also acted as a CMO board member mentioned the time involved with this responsibility. Time in their opinion that that could have potentially been better used focussing on their business. Resultantly, the SG&A variable is modelled as slightly higher in the first year to include the cost impact of participation in CMO activities.

Furthermore, as was the case with the isolated performance scenario, in order to retain model simplicity it is assumed that other income and expenses are zero throughout. However, this line item

could be used to incorporate the impact of any one off payment associated with participation in CMO activity.

Table 12: Forecasted Collaborative State Supporting Schedules for XYZ Company

Working Capital Schedule	**20x4**	**20x5**	**20x6**	**20x7**	**20x8**
Accounts Recievable Days	8	8	7	7	6
Inventory Days	46	44	42	40	40
Other Current Assets % of Net Sales	0%	0%	0%	0%	0%
Accounts Payable Days	35	35	35	35	35
Accrued Liabilities % of GOGS	0%	0%	0%	0%	0%
Other Current Liabilitiues % of COGS	0%	0%	0%	0%	0%
Net Working Capital	10 256	9 691	8 398	7 695	7 187
Change in Working Capital	10 574	-565	-1 293	-703	-508
Depreciation Schedule	**20x4**	**20x5**	**20x6**	**20x7**	**20x8**
Capital Expenditure	20 000	5 000	5 000	20 000	-
Asset Sales and Write-Offs	-	-	-	-	-
Usefull Life - Existing PPE					
UsefulL Life - New PPE (paired with Capex)	5	5	5	5	5
Depreciation Charge	2 473	4 737	5 942	8 221	10 110
Other Long Term Items Schedule	**20x4**	**20x5**	**20x6**	**20x7**	**20x8**
Other Long Term Assets	-	-	-	-	-
Increase/Decrease In Long Term Assets	-	-	-	-	-
Other Long Term Liabilities	-	-	-	-	-
Increase/Decrease In Long Term Liabilities	-	-	-	-	-
Debt and Interest Schedule	**20x4**	**20x5**	**20x6**	**20x7**	**20x8**
Long Term Debt					
Opening Balance	-	16 000	12 000	8 000	4 000
Issuance	16 000	-	-	-	-
Repayment	-	-4 000	-4 000	-4 000	-4 000
Closing Blance	16 000	12 000	8 000	4 000	-
Interest Rate on Long Term Debt	11%	11%	11%	11%	11%
Interest Expense	880	1 540	1 100	660	220
Cash					
Average Balance	1 142	473	7 293	9 845	18 729
Interest Rate on Cash	3%	3%	3%	3%	3%
Interest Income	29	12	182	246	468
Shareholders Equity Schedule	**20x4**	**20x5**	**20x6**	**20x7**	**20x8**
Assumed current year EPS multiple	4	4	4	4	4
Shares Repurchased	0	0	0	0	0
Total Dividends Paid	1 250	2 365	2 410	3 076	3 480
Dividend Payout Ratio	20%	20%	20%	20%	20%

Table 12 lists the forecast variables for supporting schedules used in the financial modelling process for the collaborative performance scenario.

In terms of impact on working capital, the values for accounts receivable and inventory days are modelled as decreasing over the forecast period as a result of the impact of Supply Chain Optimisation. This programme is predominantly focussed on optimising the domestic and international supply chain linkages, which should have a positive effect on delivery times and resultantly inventory and debtor days. Furthermore, the World Class Manufacturing is aimed at improving production process which should positively impact inventory days. Accounts payable, well below 90 days, is kept constant at historical three year average levels of 35 throughout the forecast period.

Capital expenditure in the first year of the forecast period is increased by 30% to R20000 over that used in the isolated scenario to include the impact of direct participation in CMO services and related investment costs for technological, production and design capability upgrades as per the World Class Manufacturing Programme. Subsequently, increased amounts of capital expenditure in the second and third years of the forecast period (20x4 & 20x5) is incurred to reflect further direct participation and related re-investment requirements. As was the case in the isolated performance scenario, depreciation is calculated on the straight line method with an estimated useful life of new PPE assets of five years and zero residual value.

Other long term assets and liabilities are again assumed to remain constant at zero throughout the forecast period. The debt and interest schedule addresses long term borrowings and interest expense and income. It is assumed that, due to increased revenues and efficiencies, a loan of R16 000 is sufficient to cover capital expenditure for the subsequent three years. Additionally, the loan has an interest rate of 11%, as opposed to the 12% in the isolated performance scenario. This is reduction in the cost of debt capital is attributed to the diversification effect and reduced income volatility due to a greater product offering resulting from technical and design skills upgrades. Finally, as was the case in isolation, it is assumed that XYZ Company maintains a 20% dividend pay-out ratio during all profitable years.

Using the forecasted Income Statement, Balance Sheet and Cash Flow Statement generated for the cooperative performance scenario, input variables for DCF is obtained and listed in Table 13. FCFF inputs, as was the case in the isolated performance scenario, are taken directly from the estimated financial statements over the forecast period. FCFF values obtained for the collaborative case are listed in Table 12.

In terms of WACC, the required return on debt is equal to the rate of long term borrowing at 11%. This borrowing rate, as mentioned prior is assumed to be lower due to a decreased variability in

equity returns resulting of technical and design skills improvements, as well as access to new markets. This reduces company risk and affords the company more favourable borrowing terms.

The required return on equity can, as was the case in the isolated performance scenario, be calculated by application of the Capital Asset Pricing Model (CAPM). Similarly to the isolated case, beta coefficients of participants were not available for approximation of returns on equity for the individual firm. However, if returns are less volatile in the collaborative state due to the differentiation effect, one can assume a Beta value closer to 1. Resultantly, due to the assumption that returns variance is lessened due to the diversification effect resulting from participation in CMO activities, the required return on equity is decreased by 1% from the industry average used in the isolated performance scenario to 14%.

Table 13: DCF for the Cooperative Performance Scenario

DCF Input Variables for XYZ Company		**20x4**	**20x5**	**20x6**	**20x7**	**20x8**
FCFF Calculation		-90	12 099	12 361	3 197	26 826
EBIT		9 533	17 954	17 657	21 775	23 922
Tax Rate		28.00%	28.00%	28.00%	28.00%	28.00%
Non-Cash Charges		2 473	4 737	5 942	8 221	10 110
Capital Expenditure		20 000	5 000	5 000	20 000	-
Change in Working Capital		-10 574	565	1 293	703	508
WACC Calculation		11.77%	12.26%	12.64%	13.00%	13.28%
Value of Debt		31 887	28 198	24 846	21 258	17 677
Value of Equity		10 968	20 429	30 071	42 375	56 297
Required Return on Debt		11%	11%	11%	11%	11%
Required Return on Equity		14%	14%	14%	14%	14%
Terminal Value Calculation						248 777.70
Steady State Free Cash Flow						26 826
Constant Growth Rate						2.5%
Firm Value Calculation		-80	9 600	8 649	1 961	147 727
t		1	2	3	4	5
FCFF		-90	12 099	12 361	3 197	275 604
(1+WACC)^t		1.1177	1.2602	1.4293	1.6303	1.8656
Firm Value	**167 856**					

Finally, the terminal value component again assumes that the steady state cash flow is equal to that of the final year in the forecast period. However, in order to include the long term impact of participation in CMO services and activities, in order to include the long terms effects associated with cluster upgrading on growth assets of the business, a constant growth rate of 2.5% (0.5% higher than used in the isolated case) is applied in the collaborative scenario.

Once all DCF input variables are obtained, the value of XYZ Company in the collaborative performance scenario can is calculated at R 167 856.

5.5.6 Firm Specific Synergy

Once firm value of XYZ Company for both the isolated (V_{XYZ}') and collaborative (V_{XYZ}) performance scenarios are calculated, firm-specific synergy expected from participation can be determined as per Equation [5.1] (restated),

$$\Delta V_{XYZ} = V_{XYZ} - V_{XYZ}'. \qquad [5.1]$$

Resultantly, the value of firm-specific synergy is calculated as,

$$\Delta V_{XYZ} = 167\,856 - 113\,642$$
$$\Delta V_{XYZ} = 54\,214$$

In terms of the capital budgeting decision to participate in CMO driven cluster promotion, it evident that (in this example) XYZ Company expects a positive financial impact from participation in CMO activity. As such, XYZ Company is expected to seek official CI membership.

5.6 Conclusion

This chapter contained an illustrative example of the practical application of the framework developed in Chapter 3. The case study uses the SAFI and presents general economic and industry specific data. Finally, the collaborative and non-collaborative performance scenarios are created and the value of CMO synergy is calculated. The following chapter concludes by discussing the framework and its practical application, as well as making recommendations for future research.

Chapter 6: Conclusion

In lieu of the requirement for additional cluster management evaluation methods (e.g. Teigland & Lindqvist, 2007; UNIDO, 2010; Sölvell & Williams, 2013), the goal of this dissertation is to develop a financial valuation framework to calculate the value of synergies attributable to the actions of a CMO. The research process is based on the research questions set out in Chapter 1. The objectives were to synthesise a CMO synergy valuation framework and model process from cluster, cluster management, and business alliance literature streams. The case study of the SAFI was conducted to gain a real world perspective for deeper understanding of cluster management activity and the impact it has on participating economic actors. The case study was also used to inform the numerical example used to illustrate the valuation process.

In order to gain a better understanding of this subject matter the literature review analysed the cluster phenomenon and cluster management (or cluster promotion) concepts. The valuation of synergy, as it applies to other business alliance transactions (specifically M&A and JV), was reviewed to set a base for framework development. It was found that the cluster phenomenon is an intricate, wide ranging and often confusing environment. The process of clustering is spoiled by definitional obscurity due to a vague definition (Martin & Sunley, 2003) and the impact of multiple schools of thought using the same terminology whilst focussing on, and including, different nuances of the greater cluster (or agglomeration) phenomenon (Rocha, 2004). This confusion was also witnessed in the case study where multiple respondents commented on the often vague nature of management impacts.

In terms of defining the cluster in order to explore the impact of its promotion/management, the literature revealed that the key components of most generally accepted cluster definitions include a primary (or identifying) value chain, the geographical bounds across which benefits accrue, and collaboration between multiple stakeholders (public sphere, private industry, academia, and labour actors). Furthermore, the level of interaction and presence of supporting industries, the critical mass of dynamic inter-linkages necessary to generate cluster value, as well as the current stage of the cluster's development lifecycle are also regularly included in cluster discussions. These elements and their interaction were found to drive clustering value through cost efficiencies and high levels of innovation. Additionally, cluster management specifically refers to any attempts at improving cluster dynamics and facilitating cooperation between cluster actors, further fuelling cluster benefits.

The primary value drivers of the cluster phenomenon, and by extension the primary focus of cluster management activity, are discovered to be twofold. Economic benefits relate to cost efficiencies and

revenue enhancements that result from localised externalities due to the close spatial proximity between participants (e.g. lower transport costs). Additionally, there are the innovative and knowledge-based benefits which are often credited as the true sources of cluster value potential. The interpersonal and highly networked interactions between members of a strong cluster create a perfect environment for fostering local rivalry that drives innovation. The close proximity also increases the potential for knowledge spill-overs which further facilitate and drive the innovative process. For example, one is more likely to talk about movies in a coffee shop in Hollywood, whilst one is more likely to talk software in Silicon Valley. The high level of innovation in clusters, combined with economic efficiencies, drive a sustainable competitive advantage that promotes growth and value creation.

The use of the synergy framework for valuation was selected for a number of reasons. Primarily the extension of a synergy valuation framework is based on the fundamental cooperative nature of cluster management. Synergy accrues in collaborative business alliances due to operational and financial similarities between multiple firms. It conveys the notion that collaborative engagements have the potential to create benefits that would not have been available to any individual actor on its own. Similarly to traditional business alliance transactions, the entire process of clustering is fundamentally focussed on a set of highly interlinked interactions between multiple actors aimed at mutual value creation. Multiple actors are central to the cluster value mechanism as no critical mass of activity would result in little or no cluster benefits.

In terms of cluster promotion, support activities are generally targeted at multiple cluster participants and necessitate a degree of cooperation. This process of promotion yields mutual value creation through the realisation of cluster benefits (both economic and non-economic). Resultantly, the process of cluster management bares significant resemblance to other forms of synergistic business alliance.

Furthermore, the process of valuation of synergy in JV and M&A is well documented and widely researched. This provided a sound theoretical base from which to set out determining the value of CMO impact. In extending the JV and M&A synergy valuation model to the CMO case, the collaborative event (i.e. JV contract or M&A transaction) is equated to participation in CMO services (i.e. all firms that are financially impacted). A conceptual model of CMO interaction with participants was established to determine the impact on firm value. In order to limit the impact problem (Sölvell, 2008) a causal relationship between participation (i.e. a source of synergy) and the change in a firm specific value driver has to be established. However, due to the wide range of potential impacts

often attributed to CMO activity, participation may be of a direct (individual/firm level) or indirect (regional/industrial/policy level) nature.

Direct participation involves the consumption of specific services and activities. Indirect participation is the impact on firms resulting from regional business environment upgrades taken by the CMO. Determining causal links for direct participation is easier as sources of synergy can be identified with reference to the consumption of a specific service or activity by individual firms. However, causal links for indirect participation is much harder to value for a number of reasons.

First, not all indirect participants are impacted to the same extent (e.g. more export heavy manufacturers will draw greater benefit from international exposure). Resultantly, estimating the expected CMO impact on the average participant would not be accurate Secondly, it is difficult to determine the level of change in a firm specific value driver, due to the often vague connection between the activity and the influence of the CMO in facilitating that activity. For example, how can one be sure that the 2% increased revenue estimated in the valuation process is not due to another source? Furthermore, cluster managers often pursue multiple non-economic objectives. If synergy is calculated as the theoretical difference in DCF value of participating firms, this financial method may fail to accurately account for the intended impact of social and knowledge based activity.

Ultimately, identification of both direct and indirect participants is subject to the operational mandate of the CMO. In the SAFI case operational goals and objectives, as well as accompanying budgets for support programmes, are outlined in the CMO's business plan document. These overarching programmes form the four main avenues of promotional support. Specific services and activities are envisioned, financed and facilitated based on the objectives of these strategic level programmes. In the process of conducting participant manager interviews, respondents were asked to comment on the impact of SAFI support services. Enquiries of the perceived impact of programmes conducted by the legacy CMO, WCFI, were also conducted in cases where individual managers participated in these.

The commentary from participant managers yielded mixed results. Certain managers agreed that the impact of participation was valuable, but that this value was not quantifiable financially. One interviewee specifically commented on the benefit from participation in a strategic management mentorship programme which yielded a then new business plan that is still in use today, five years on. This participant specifically mentioned the difficulty with quantifying, in financial (or any other) terms, participation in an activity that likely saved the business from potentially downgrading.

The process of conducting the numerical example highlighted some of the difficulties in practical application of the theoretical CMO synergy framework. During the process of data collection it became evident that managers were unfamiliar with the DCF valuation approach. Even though the concept of time value of money and related discounting practices were conceptually understood, none of the participants had ever conducted a full scale firm valuation by means of the multi-period DCF approach (i.e. DCF with FCFF and WACC). Managers were presented with a list of DCF forecast variables required for financial modelling. However, even with the aid of project budgets, estimating the impact of direct participation was considered difficult, or tedious, at best. In cases where participation was evaluated ex-post, many participants struggled with the notion of mutual exclusivity of performance scenarios and estimating the value of impacted line items for the non-collaborative case. All participants just shrugged at the idea of trying to estimate the impact of indirect participation. In one extreme case, the participant blatantly asked what the point of all this was.

It is unclear whether or not this is due only to unfamiliarity with the DCF framework, or also due to unfamiliarity with SAFI activity. In other words, it is unclear whether or not the confusion regarding estimations is based in an understanding of the value driver, or the source of synergy. It should however be noted that the low levels of financial competency displayed by managers is a limitation to the application of this framework. It is recommended that future repetitions of this study ensure that participants have a basic mastery of the financial and valuation principles used in this model. For SAFI specifically, this would result in management financial training programmes, however, the sample size used in the case study is not representative of the population and further studies into the financial competency of business managers is recommended.

Furthermore, and regardless of manager grasp of DCF fundamentals, the CMO synergy valuation framework faces problems in terms of practical application due to the difficulties in relating CMO impacts (sources of synergy) to firm level value drivers. This is not only complicated by the often non-economic focus of CMO activity, but also due to the potential for indirect participation by members. Due to the difficulties encountered with estimating impacts, it is recommended that the process of data collection run concurrently with the participation in promotional activity. In this way company managers who are unfamiliar with the valuation process can be guided in estimating the impact on firm-specific value drivers.

Future research should also focus on superior methods of determining the impact of CMO activities and their relationship to firm-level value drivers. Development of methods to limit the distorting impact of the wide scope of CMO activity, as well as the presence of multiple indirect impacts and

non-economic effects will aid in increasing the accuracy of results obtained. For example, statistical methods (e.g. sensitivity analysis or simulation) should be explored in order to improve accuracy of estimations. Alternatively, the use of real-options valuation can be evaluated as a more accurate method of determining the intrinsic value of non-economic CMO impacts on participants.

In light of the strengths and limitations of this approach, the framework developed in this research seeks to contribute to the commonly used cluster management evaluation toolkit. The cluster sphere is too dynamic and multi-faceted to ever be measured in a single statistic; there exists no proverbial cluster '*terrior*'[4] that neatly describes the impact of all relevant elements. As is the case with most prominent evaluation methods, a multiple methods approach is likely to provide the best, and most informative, results. Development of this framework will enable analysts to conduct a similar (financially focussed) CMO synergy approaches in addition to other existing methods in future studies.

[4] *Terrior* is a French word that describes the set of factors (earth, rain, sun, etc.) that come together to provide each wine its unique qualities.

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Appendix A: Transcript of Cluster Manager Interview

This transcript makes use of the following notation:

Section Heading

Main Question?

Sub Question? [usually refers to prior main question]

[Indication of places the researcher was referred to other sources for an answer]

Respondent Answers

S1) General Information

1.1 Name of Cluster Initiative?

Western Cape Furniture Initiative (WCFI) → South African Furniture Initiative (SAFI)

1.2 Age (in years) of the Cluster Initiative?

February 2009 (WCFI) → August 2015 (SAFI)

1.3 Industrial sector of Cluster Initiative?

Furniture Manufacturing

1.4 Original trigger for Cluster Initiative activity?

WCFI = WC Provincial Government → identification of furniture industry as sector that needs strategic intervention and support (Department of Economic Development and Tourism, DEDAT; Forestry Industry Educational Training Authority (FIETA), Furniture Bargaining Council of the Western Cape (FBCWC).

SAFI = National Industry → Identification of cluster initiative support opportunity after dissolution of WCFI due to suspension of funding from provincial government. WCFI model expanded to a national level to include KZN and GP province furniture sectors.

S2) Cluster Initiative Management (Governance)

2.1 Legal status of Cluster Management Organisation (CMO):

2.1.1 Is the CMO incorporated as a stand-alone entity?

Yes → pursuant to section 19(1)(a) of Companies Act (body corporate with own legal identity separate from members)

2.1.2 Is the CMO a non-profit organisation?

Yes → Non-Profit Company, (Companies Act, 2008)

2.1.3 Is the CMO a non-government organisation?

Operationally, SAFI is a NGO (i.e. SAFI board & operations not primarily government driven). However, project funding is received through public channels.

2.2 Sources of funding:

2.2.1 Private Funding (e.g. membership fees, levies, sales of CI services)

Operational funding = private in form of levies (funding structure discussions)

(Funding weights based on size of regional industry: WC = 19.69; KZN = 18.29; GP = 64.02)

All furniture manufacturers have to be part of the furniture bargaining council (FBC), which has legal power in the furniture sector. The BC consists of two main arms, employers' associations and labour unions. The FBC charges all individual manufacturers a levy. Levy consists of labour and employer contribution. Employers make deductions in lieu of FBC levy (similar to medical / pension deductions) from labour (per individual). Employers match this contribution and make payments to the FBC. SAFI has positioned itself as the 'operational arm' of the FCB. Funding for SAFI operations flows through FBC; resultantly operational funding for SAFI = 100% industry sources via FBC levy structure.

2.2.2 Public Funding (specify if international, national, or regional public bodies)

The public sector in South Africa is invested (through the IPAP) in the development of regional industries & clusters. Project specific funding is obtained from public sources.

(In WCFI – provincial government; in SAFI – national government)

2.3 Composition of Cluster Initiative board:

Ideal/Proposed (as per SAFI Memorandum of Incorporation):

15 Voting Members

Employers Organisations 9 -> 3/3/3 per province

Trade Unions	4	
Retail	1	
Suppliers	1	
Observers		
National Public (observers)	3	→ DTi, SETA, EDD
Academic (observers)	1	

Actual Representation:

2.3.1 Industry?

FBC – main, split between employers (employers' associations) and labour (unions).

Employers = 8

Unions = 2

FBC = 1

2.3.2 Public Sector?

Representation from all 3 levels of government (national, local and provincial)

National representation on Board, involvement of local and provincial

2.3.3 Academia?

Project based inclusion

TVET – technical and vocational education and training

FET – Further education and training

Academia = 1

2.3.4 Other (please specify)?

Service providers = 1

Retail = 1

2.4 Role of Cluster Initiative Board?

[Referred to SAFI Inaugural Business Plan]

Ensure that SAFI vision, mission and objectives are achieved.

2.5 Board Appointment Process?

Nomination (and seconded) → Industry review → Board of Directors review → Ratification at AGM.

Potential for board vote on appointments if members unhappy with selection, not yet happened in WCFI/SAFI.

SAFI has a CEO/ COO system; CEO responsible for strategic decision making and COO responsible for operational decision making.

S3) Participants of the Cluster Initiative

3.1 Number of potential participants in cluster region (both official and non-official participants)?

Uncertain: speculation of double the number of formal entities

3.2 Number of formal CMO members?

ITO employees (due to funding structure): WC: 6033, KZN: 3050, GP: 16929

3.2.1 Industry affiliation of formal participants (main or supporting value chain)?

Main value chain only → Furniture manufacturing sector.

Supporting representation on board for secondary value chain sectors (labour, retail, suppliers)

3.3 Number of formal CMO members within 1 hour's drive of CMO office?

Main SAFI Office in Belville (Cape Town, Western Cape Province). Uncertain of exact numbers and exact geographic dispersion of members.

S4) Cluster Manager

4.1 Number of years' experience as cluster manager?

WCFI official CEO: June 2009 – August 2014

Intrim/Consultant CEO SAFI: August 2014 – December 2008 (Piloting phase)

4.2 Previous work in other Cluster Initiatives:

4.2.1 Yes/No?

N/A

4.2.2 In what industry (or specific CI)?

N/A

4.2.3 How long?

N/A

S5) Objectives of Cluster Initiative/CMO

5.1 What are the Objectives of the CMO/CI?

Of WCFI:

Aims to facilitate delivery of value-adding programs to members.

Objectives:

Represents interest of all furniture value chain

Platform for implementation of strategic interventions for furniture industry in the WC

Geared to produce economic growth, competitiveness, innovation, and export opportunities

Of SAFI [referred to SAFI Inaugural Business Plan for identification]:

Promote advanced design and manufacturing capabilities to be recognised locally and internationally

Objectives:

Provide market and industry information

Facilitate support services

Position industry to penetrate domestic and international markets

Facilitate supply chain optimisation

Promote effective management and design

Objective framework used = 4 Pillars of promotion – numerous activities (17)

Market access plan

Support services

World class manufacturing

Supply chain management

Note: “research ripple effect”

Impacts of government action under view that a negative correlation between labour and advanced technology.

5.2 Objectives as per Cluster Greenbook (Sölvell, Lindqvist & Ketels, 2003. pp.11)?

5.1 Cluster Expansion (e.g. regional brand/image, promoting investment (FDI), incubator services, spin-offs)?

Yes

5.2 Innovation & Technology (e.g. following/promoting technical trends, setting technical standards, diffusing new technology, improving production processes)?

Yes, but “of the 6, probably last on list”

5.3 Education & Training (e.g. management education and/or labour skills development and training)?

Yes

5.4 Commercial Cooperation (e.g. joint operations, business assistance, market intelligence, export promotion)?

Yes

5.5 Policy Action (e.g. lobbying government & creating dialogue between industry, public sphere and scientific community)?

Yes

5.6 Research & Networking (e.g. research = information gathering, publishing cluster reports, seminars, guest speakers, creating websites; networking = developing/facilitating functional connections between cluster participants)?

Yes & Yes

S6) Projects Hosted

Please elaborate on projects (services and/or activities) hosted by the CMO. For each project describe:

6.1 & 6.2 Project Name & Activities

[referred to SAFI annual report 2015 for identification]

a) Employment Creation Fund

b) Jigsaw design competition

c) Qualifications Development

d) Recognition of Prior Learning

e) Industry Skills Strategy

6.3 Cost of Project

[referred to SAFI annual report 2015 for identification]

Project Budgets (2015)	Balance	Receipts	3rd party payment	SAFI Income	Balance
Employment Creation Fund	1792794		-1565838	-166086	60870
Jigsaw Design Competition	-30243	75000	-43531	-1226	0
Qualifications Development Project	0	1360000	-218611	-19284	1122105
Recognition of Prior Learning	0	378000	-354600	-12270	11130
Skills Strategy	0	800000	-745000	0	55000
Totals	**-30243**	**2613000**	**-1361742**	**-32780**	**1188235**

6.3 Intended Impact

a) Politically driven project aimed at increasing the contribution to national employment levels from the furniture sector.

b) Aim of creating 'hype' and generating exposure for local design.

c) Facilitation of transformation of vocational occupations to the new Quality Council for Traders and Occupations (QCTO) format.

d) Understand skills present in company, understand skills gap in company, issue certificate of competency for employees

e) Build talent ID system (web based, industry wide), provide companies with computerised tools to profile workplace populations, develop a centralised skills database, unlock the sector role players, and build a research and evidence gathering system

S6) Performance of Cluster Initiatives

6.1 Cluster Initiative Growth and Expansion

Provincial → National. Growth of CI, national roll-out indicates opinion of success of promotional activity.

Success stories included in annual reports.

6.1.1 New Participants

Provincial → National. Employers increased form 291 (WC) to 3000 (National).

6.2 Increases in Innovation *(new technology)*

World Class Manufacturing Program

Research always to justify core focus of projects

6.3 Increases in Competitiveness *(national & international markets)*

Focus on export promotion through international trade missions and brand building. Information/Learning Visits to Established Cluster Initiatives in Sweden.

6.4 Overall Goals & Deadlines Met (out of 10)?

"9/10"

6.5 Financial Sustainability (of the CMO entity)*?*

"people are investing time and money so we are obviously doing something right"

S7) Cluster Evaluation

7.1 Is the CI subject to any formal evaluation process?

Yes

WCFI = Official reports (quarterly) to board and government role players

SAFI = Same structure carried over to new CI. Quarterly board

7.2 Sources of Data Collection used for evaluation

Financial

Qualitative (surveys, questionnaires, interviews).

7.3 Frequency of Data Collection

As per report requirements

Appendix B: List Required Forecast Variables Included in Industry Member Interview Process

As part of the company manager interview process, participants were asked to comment on the expected (or observed) impact of participation in CMO facilitated cluster promotional activity. The following outlines the list of forecast variables managers were asked to comment on. In the tables listed in this Appendix, 'IN' represents forecast variables for the in-collaboration performance scenario, 'OUT' represents forecast variables for the out-of-collaboration (i.e. isolated) performance scenario.

S1 - Income Statement

Net Sales Growth

Forecasted Net Sales Growth (annualised percentage variable)					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

Other Income

Forecasted Other Income As Percentage Growth, or					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					
As Absolute Value (R'000)					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

Gross Margin

Forecasted Gross Margin (annualised percentage variable)					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

Sales, General, & Admin (SG&A) Expense

Forecasted SG&A As Percentage of Net Sales, or					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					

OUT					
OR as Absolute Value (R'000)					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

Effective Tax Rate

Expected Company Tax Rate					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

S2 - Working Capital Schedule

Accounts Receivable Days

Accounts Receivable Days (AR/Sales*365)					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

Inventory Days

Inventory Days (INV/COGS*365)					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

Accounts Payable Days

Accounts Payable Days (AP/COGS*365)					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

Other Current Assets

Forecasted Other Current Assets As Percentage of Net Sales, or					
Year	2xx1	2xx2	2xx3	2xx4	2xx5

IN					
OUT					
Forecasted Other Current Assets As Absolute Value					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

Accrued Liabilities Percentage of GOGS

Forecasted Accrued Liabilities As Percentage of Net Sales, or					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					
As Absolute Value (R'000)					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

Other Current Liabilities

Forecasted Other Current Liabilities As Percentage of Net Sales, or					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					
As Absolute Value (R'000)					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

S3 - Depreciation and Amortization Schedules

Existing PPE

Total PPE	*(historic/current)*	
	Non-Depreciable (Land)	
	Depreciable	
Remaining Useful Life in Years		
Depreciation Method:		

Capital Expenditure

Historic Capital Expenditure (R'000)					
Year	1xx6	1xx7	1xx8	1xx9	2xx0
Value					
Forecasted Capital Expenditure If Percentage of Net Sales, or					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					
As Absolute Value (R'000)					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					
New Capex - Useful Life (years)					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

Asset Sales and Write Offs

Asset Sales/ Write Offs (R'000)					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

Additions to Intangibles

Historic Additions to Intangibles (R'000)					
Year	1xx6	1xx7	1xx8	1xx9	2xx0
Value					
Forecasted Additions to Intangibles As Percentage of Net Sales, or					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					
As Absolute Value (R'000)					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					
Additions to Intangibles - Useful Life (years)					

Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					
Intangible Sales/ Write Offs (R'000)					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

S4 - Other Long Term Assets & Liabilities Items Schedule

Other long term assets & liability classes not included in Depreciation and Amortization schedules:

Deferred Income Tax (Asset or Liability)

Deferred Income Tax (R'000)					
If Asset					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					
If Liability					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

Other Long Term Items

This includes any other non-PPE and non-deferred tax assets and liabilities.

Other Long Term Items (R'000)					
Assets					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					
Liabilities					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

S5 - Shareholders' Equity Schedule

Assumed current year EPS multiple

_____

Historic Shares Repurchased

Number of Shares Repurchased					
Year	1xx6	1xx7	1xx8	1xx9	2xx0
Value					
Amount (value) of Share Repurchases (R'000)					
Year	1xx6	1xx7	1xx8	1xx9	2xx0
Value					

Expected Future Shares Repurchases

Number of Shares Repurchased					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					
Value of Share Repurchase (R'000) – outflow					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

New shares from Exercised Options (Historic)

Number of Shares Repurchased					
Year	1xx6	1xx7	1xx8	1xx9	2xx0
No. New Shares from Options Exercised					
Option Proceeds					

New shares from Exercised Options (Forecasted)

No. New Shares from Options Exercised					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					
Average Strike Price of Share Options					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

Dividends

Historic Dividends Paid (R'000)					
Year	1xx6	1xx7	1xx8	1xx9	2xx0
Value					
Forecasted Dividend pay-out Ratio					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

Exchange Rate Effect – Foreign Holdings of Cash

Expected Exchange Rate Effect on Cash					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

S6 - Shares Outstanding

Shareholders Outstanding (Historic)

Ending Balance (Basic Outstanding Shares)					
Year	1xx6	1xx7	1xx8	1xx9	2xx0
Number					
Basic Weighted Average Shares					
Year	1xx6	1xx7	1xx8	1xx9	2xx0
Number					
Effects of Options and Dilutive Securities					
Year	1xx6	1xx7	1xx8	1xx9	2xx0
Value					

Shareholders Outstanding (Forecasted)

Effects of Options and Dilutive Securities					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

S8 - Debt & Interest Schedule

This schedule is used to calculate the cash available for debt (capital) and interest repayments. Estimations of the following are required:

Minimum Cash Balance (max overdraft)

Minimum Cash Balance					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

Long Term Debt

Repayment/Amortisation					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					
Long Term Debt – Interest Rate					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

Interest rate on revolving credit facility

Revolving Credit – Interest Rate					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

Interest rate on Cash Balances

Cash Balance – Interest Rate					
Year	2xx1	2xx2	2xx3	2xx4	2xx5
IN					
OUT					

Appendix C: Historical Financial Statements for XYZ Company

Historical Income Statement of XYZ Company	20x1	20x2	20x3	Average
Sales	203 795	202 120	233 121	213 012
Cost of Sales	139 039	138 946	159 820	145 935
Gross Profit	64 756	63 174	73 301	67 077
Other Income	-	-	-	-
SG&A Expense	49 504	53 588	64 530	55 874
Other Expense	-	-	-	-
EBITDA	15 252	9 586	8 771	11 203
Depreciation	8 754	4 428	912	4 698
EBIT	6 498	5 158	7 859	6 505
Interest Income	49	5	188	81
Interest Expense	3 003	-	-	1 001
EBT (pre-tax income)	3 544	5 163	8 047	5 585
Tax	992	1 446	2 279	1 572
Net Profit	2 552	3 717	5 768	4 012
Margins				
Gross Margin	31.78%	31.26%	31.44%	31%
SG&A as % of Net Sales	24.29%	26.51%	27.68%	26%
Other Income as % of Net Sales	0.00%	0.00%	0.00%	0%
Other Expense as % of Net Sales	0.00%	0.00%	0.00%	0%
EBITDA Margin	7.48%	4.74%	3.76%	5%
EBIT Margin	3.19%	2.55%	3.37%	3%
Net Profit Margin	1.25%	1.84%	2.47%	2%
Growth Rate Analysis				
Net Sales Growth		-0.82%	15.34%	7%
EBITDA Growth		-37.15%	-8.50%	-23%
Net Profit Growth		45.65%	55.18%	50%
Tax Rate	28.00%	28.00%	28.00%	28%

Appendix C - Continued

Historical Balance Sheet of XYZ Company	20x1	20x2	20x3	Average
Assets				
Non-Current Assets	15 771	3 753	1 593	7 039
PPE	6 354	1 971	1 593	3 306
Other Long Term Assets	9 417	1 782	-	3 733
Current Assets	28 156	22 010	25 244	25 137
Cash	1 220	114	4 692	2 009
Accounts Recievable	8 432	1 915	3 910	4 752
Inventory	18 504	19 981	16 642	18 376
Other Current Assets	-	-	-	-
Total Assets	43 927	25 763	26 837	32 176
Equity	1 368	3 716	5 967	3 684
Common Shares	100	100	100	100
Retained Income	1 268	3 616	5 867	3 584
Long term liabilities	27 808	1 532	-	9 780
Long Term Debt	25 027	-	-	8 342
Other Long Term Liabilities	2 781	1 532	-	1 438
Current Liabilities	14 751	20 515	20 870	18 712
Accounts Payable	14 751	7 430	20 870	14 350
Accrued Liabilities	-	-	-	-
Other Current Liabilities	-	13 085	-	4 362
Total Equity and Liabilities	43 927	25 763	26 837	32 176

Appendix C - Continued

Historical Supporting Schedule Ratios and Values for XYZ Company					
Working Capital Schedule		**20x1**	**20x2**	**20x3**	**Average**
Accounts Recievable Days		15.10	3.46	6.12	8
Inventory Days		48.58	52.49	38.01	46
Other Current Assets % of Net Sales		0%	0%	0%	0%
Accounts Payable Days		38.72	19.52	47.66	35
Accrued Liabilities % of GOGS		0%	0%	0%	0%
Other Current Liabilitiues % of COGS		0%	9%	0%	3%
Net Working Capital		12 185	1 381	-318	4 416
Change in Working Capital			-10 804	-1 699	-6 251.50
Depreciation Schedule		**20x1**	**20x2**	**20x3**	**Average**
Capital Expenditure		3 024	-	-	1 008
Asset Sales and Write-Offs		-	-	-	-
Usefull Life - Existing PPE	2 yrs				-
UsefulL Life - New PPE (paired with Capex)					-
Depreciation Charge		8 754	4 428	912	4 698
Other Long Term Items Schedule		**20x1**	**20x2**	**20x3**	**Average**
Other Long Term Assets		9 417	1 782	-	3 733
Increase/Decrease In Long Term Assets			-7 635	-1 782	-4 708.50
Other Long Term Liabilities		2 781	1 532	-	1 438
Increase/Decrease In Long Term Liabilities			-1 249	-1 532	-1 390.50
Debt and Interest Schedule		**20x1**	**20x2**	**20x3**	**Average**
Long Term Debt					-
Opening Balance					-
Issuance					-
Repayment					-
Closing Blance		25 027	-	-	8 342
Interest Rate on Long Term Debt					-
Interest Expense					-
Cash					-
Opening Balance					-
Interest Rate on Cash					-
Interest Income					-
Shareholders Equity Schedule		**20x1**	**20x2**	**20x3**	**Average**
Assumed current year EPS multiple		0	0	0	-
Shares Repurchased - millions		0	0	0	-
Total Dividends Paid		514	685	941	713
Dividend Payout Ratio		20%	18%	16%	18%